Vol. 1144 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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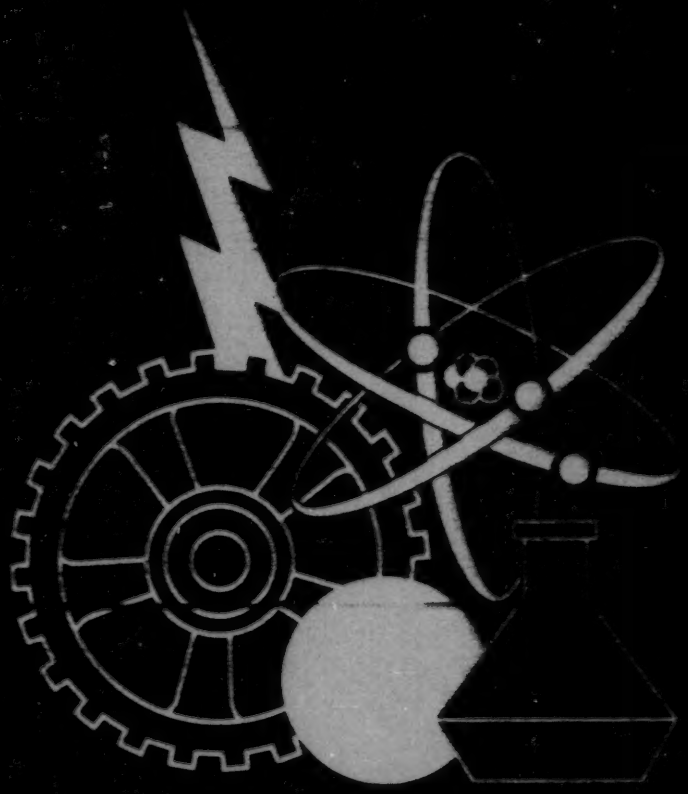
PATENTS

November 3, 1992



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

November 3, 1992 Volume 1144 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning PCT member countries, see the notice appearing in the *Official Gazette* at 1142 O.G. 66, on Sept. 29, 1992.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52, on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2, on July 7, 1987 and at 1091 O.G. 2, on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed on Oct. 1, 1992, due to changes both in the amount of the international search fee charged by the European Patent Office and in the exchange rate of the U.S. dollar to the German mark, and was announced in the *Official Gazette* at 1142 O.G. 20, on Sept. 8, 1992.

International fees were changed on January 1, 1992, due to a decision of the Assembly of the PCT Union taken during its meeting from 23 September 1991 to 02 October 1991, and were announced in the *Official Gazette* at 1133 O.G. 98, on Dec. 24, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Oct. 1, 1992 and were announced in the *Official Gazette* at 1141 O.G. 68 on Aug. 25, 1992.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	200.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	620.00
—Corresponding prior U.S. national application filed	410.00
—Supplemental search fee, per additional invention	170.00
European Patent Office as ISA	1635.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	450.00
—Additional examination fee, per additional invention	140.00
—ISA not the USPTO	670.00
—Additional examination fee, per additional invention	230.00
International fees	
Basic fee	525.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	127.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	161.00

U.S. National Stage fees	Small Entity	Regular
USPTO was IPEA	320.00	640.00
USPTO was ISA but not IPEA	355.00	710.00
USPTO was neither ISA nor IPEA	475.00	950.00
Filing with an EPO or JPO search report	415.00	830.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	45.00	90.00
—For each independent claim in excess of 3	37.00	74.00
—For each claim in excess of 20	11.00	22.00
—For each application containing a multiple dependent claim	115.00	230.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	65.00	130.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	130.00	130.00

Sept. 4, 1992

DOUGLAS B. COMER,
Acting Assistant Secretary and Acting Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d) provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(h), as amended effective Dec. 16, 1991. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on October 31, 1989 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,876,745 through 4,878,254
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on October 29, 1985 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,549,315 through 4,550,444
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

For patents based on applications filed on or after December 12, 1980, but before August 27, 1982, patent owners must establish small entity status according to 37 CFR 1.27 if they have not done so and if they wish to pay the small entity.

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months and eleven years and six months are set forth in 37 CFR 1.20(e)-(g), as amended Oct. 1, 1992, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 , in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§ 1.9f) $465.00
By other than a small entity $930.00

(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§ 1.9f) $935.00
By other than a small entity $1,870.00

(g) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Dec. 12, 1980, in force beyond 12 years; the fee is due by eleven years and six months after the original grant:

By a small entity(§ 1.9(f)) $1,410.00
By other than a small entity $2,820.00

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(h), and (i), which are reproduced below:

(h) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980

By a small entity (§ 1.9f) $65.00
By other than a small entity $130.00

(i) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable $620.00

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED AUGUST 30, 1992
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
Re. 32,648	06/900,322	4/19/88
(4,468,105)	(06/366,424)	(8/28/84)
4,467,475	06/493,736	8/28/84
4,467,478	06/419,712	8/28/84
4,467,488	06/452,550	8/28/84
4,467,491	06/496,944	8/28/84
4,467,492	06/481,991	8/28/84
4,467,494	06/369,572	8/28/84
4,467,497	06/429,467	8/28/84
4,467,500	06/453,617	8/28/84
4,467,506	06/447,042	8/28/84
4,467,508	06/431,076	8/28/84
4,467,512	06/345,236	8/28/84
4,467,524	06/460,496	8/28/84
4,467,529	06/422,597	8/28/84
4,467,530	06/384,928	8/28/84
4,467,532	06/456,266	8/28/84
4,467,536	06/482,917	8/28/84
4,467,550	06/294,450	8/28/84
4,467,551	06/453,769	8/28/84
4,467,553	06/369,477	8/28/84
4,467,564	06/278,120	8/28/84
4,467,568	06/415,360	8/28/84
4,467,573	06/321,179	8/28/84
4,467,580	06/408,909	8/28/84
4,467,581	06/352,061	8/28/84
4,467,583	06/411,110	8/28/84
4,467,584	06/355,703	8/28/84
4,467,600	06/496,336	8/28/84
4,467,606	06/326,210	8/28/84
4,467,608	06/376,134	8/28/84
4,467,614	06/457,259	8/28/84
4,467,617	06/466,959	8/28/84
4,467,619	06/407,031	8/28/84
4,467,623	06/456,132	8/28/84
4,467,638	06/494,287	8/28/84
4,467,639	06/478,754	8/28/84
4,467,644	06/438,099	8/28/84
4,467,645	06/477,255	8/28/84
4,467,649	06/381,841	8/28/84
4,467,661	06/548,039	8/28/84
4,467,662	06/485,392	8/28/84
4,467,664	06/306,208	8/28/84
4,467,666	06/257,574	8/28/84
4,467,671	06/349,751	8/28/84
4,467,672	06/303,022	8/28/84
4,467,677	06/479,695	8/28/84
4,467,681	06/231,733	8/28/84
4,467,694	06/383,214	8/28/84
4,467,697	06/365,380	8/28/84
4,467,698	06/321,736	8/28/84
4,467,706	06/356,106	8/28/84
4,467,710	06/330,663	8/28/84
4,467,715	06/470,769	8/28/84
4,467,716	06/534,807	8/28/84
4,467,718	06/398,319	8/28/84
4,467,722	06/495,638	8/28/84
4,467,725	06/351,655	8/28/84
4,467,727	06/418,722	8/28/84
4,467,731	06/407,954	8/28/84
4,467,733	06/570,520	8/28/84
4,467,736	06/489,147	8/28/84
4,467,738	06/435,498	8/28/84
4,467,739	06/454,050	8/28/84
4,467,743	06/263,364	8/28/84
4,467,744	06/428,983	8/28/84
4,467,748	06/508,543	8/28/84
4,467,751	06/328,390	8/28/84
4,467,752	06/390,525	8/28/84
4,467,759	06/434,295	8/28/84
4,467,762	06/405,447	8/28/84
4,467,763	06/416,848	8/28/84
4,467,766	06/500,047	8/28/84
4,467,767	06/359,631	8/28/84
4,467,774	06/532,136	8/28/84
4,467,777	06/522,511	8/28/84
4,467,778	06/422,100	8/28/84
4,467,779	06/418,221	8/28/84
4,467,781	06/468,641	8/28/84
4,467,782	06/294,357	8/28/84
4,467,789	06/310,493	8/28/84
4,467,794	06/346,580	8/28/84
4,467,805	06/411,470	8/28/84
4,467,812	06/399,866	8/28/84
4,467,814	06/359,954	8/28/84
4,467,819	06/534,998	8/28/84
4,467,822	06/304,002	8/28/84
4,467,823	06/318,208	8/28/84
4,467,830	06/257,779	8/28/84

Patent Number	Serial Number	Issue Date
4,467,837	06/286,004	8/28/84
4,467,838	06/466,425	8/28/84
4,467,841	06/462,429	8/28/84
4,467,843	06/316,399	8/28/84
4,467,845	06/367,979	8/28/84
4,467,848	06/399,384	8/28/84
4,467,851	06/487,090	8/28/84
4,467,852	06/418,748	8/28/84
4,467,861	06/432,788	8/28/84
4,467,869	06/478,563	8/28/84
4,467,871	06/483,646	8/28/84
4,467,873	06/448,398	8/28/84
4,467,879	06/362,741	8/28/84
4,467,882	06/421,439	8/28/84
4,467,883	06/411,994	8/28/84
4,467,887	06/326,002	8/28/84
4,467,891	06/508,400	8/28/84
4,467,893	06/399,335	8/28/84
4,467,910	06/323,796	8/28/84
4,467,915	06/405,712	8/28/84
4,467,916	06/371,899	8/28/84
4,467,918	06/387,845	8/28/84
4,467,922	06/431,402	8/28/84
4,467,926	06/353,635	8/28/84
4,467,936	06/283,538	8/28/84
4,467,941	06/431,175	8/28/84
4,467,943	06/398,775	8/28/84
4,467,947	06/527,135	8/28/84
4,467,952	06/455,054	8/28/84
4,467,957	06/427,825	8/28/84
4,467,961	06/348,087	8/28/84
4,467,965	06/487,152	8/28/84
4,467,972	06/392,800	8/28/84
4,467,982	06/373,298	8/28/84
4,467,999	06/350,413	8/28/84
4,468,001	06/413,398	8/28/84
4,468,004	06/453,272	8/28/84
4,468,007	06/503,870	8/28/84
4,468,008	06/503,480	8/28/84
4,468,015	06/377,428	8/28/84
4,468,016	06/287,298	8/28/84
4,468,019	06/382,326	8/28/84
4,468,023	06/420,021	8/28/84
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4,468,045	06/403,026	8/28/84
4,468,046	06/490,292	8/28/84
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4,468,058	06/479,663	8/28/84
4,468,064	06/369,626	8/28/84
4,468,072	06/331,665	8/28/84
4,468,076	06/401,176	8/28/84
4,468,079	06/517,649	8/28/84
4,468,087	06/488,561	8/28/84
4,468,093	06/448,109	8/28/84
4,468,097	06/421,421	8/28/84
4,468,102	06/349,206	8/28/84
4,468,103	06/335,068	8/28/84
4,468,107	06/397,806	8/28/84
4,468,108	06/388,981	8/28/84
4,468,118	06/419,645	8/28/84
4,468,126	06/267,296	8/28/84
4,468,127	06/411,851	8/28/84
4,468,128	06/323,918	8/28/84
4,468,129	06/496,778	8/28/84
4,468,131	06/374,018	8/28/84
4,468,132	06/487,100	8/28/84
4,468,134	06/387,069	8/28/84
4,468,143	06/430,545	8/28/84
4,468,145	06/493,627	8/28/84
4,468,147	06/421,026	8/28/84
4,468,150	06/370,839	8/28/84
4,468,151	06/368,426	8/28/84
4,468,155	06/444,297	8/28/84
4,468,160	06/416,155	8/28/84
4,468,164	06/405,659	8/28/84
4,468,175	06/425,515	8/28/84
4,468,183	06/413,513	8/28/84
4,468,186	06/365,650	8/28/84
4,468,194	06/478,561	8/28/84
4,468,197	06/488,676	8/28/84
4,468,200	06/549,585	8/28/84
4,468,204	06/352,115	8/28/84
4,468,205	06/457,677	8/28/84
4,468,208	06/314,040	8/28/84
4,468,214	06/377,047	8/28/84
4,468,216	06/380,053	8/28/84
4,468,228	06/516,134	8/28/84
4,468,232	06/517,848	8/28/84
4,468,237	06/435,114	8/28/84
4,468,241	06/427,166	8/28/84
4,468,243	06/356,420	8/28/84
4,468,244	06/447,838	8/28/84
4,468,246	06/356,669	8/28/84
4,468,247	06/391,022	8/28/84
4,468,248	06/327,320	8/28/84
4,468,250	06/463,139	8/28/84
4,468,258	06/400,678	8/28/84
4,468,266	06/475,912	8/28/84
4,468,268	06/448,423	8/28/84
4,468,270	06/286,682	8/28/84
4,468,271	06/437,221	8/28/84
4,468,274	06/399,417	8/28/84
4,468,276	06/474,722	8/28/84
4,468,279	06/408,393	8/28/84
4,468,284	06/511,542	8/28/84
4,468,286	06/541,585	8/28/84
4,468,287	06/330,677	8/28/84
4,468,288	06/358,798	8/28/84
4,468,290	06/535,712	8/28/84
4,468,298	06/451,070	8/28/84
4,468,299	06/451,071	8/28/84
4,468,300	06/451,072	8/28/84
4,468,302	06/411,934	8/28/84
4,468,303	06/445,847	8/28/84
4,468,306	06/482,488	8/28/84
4,468,315	06/337,682	8/28/84
4,468,316	06/471,687	8/28/84
4,468,319	06/374,763	8/28/84
4,468,320	06/391,181	8/28/84
4,468,322	06/458,327	8/28/84
4,468,331	06/417,519	8/28/84
4,468,335	06/373,550	8/28/84
4,468,342	06/310,545	8/28/84
4,468,349	06/288,567	8/28/84
4,468,362	06/451,407	8/28/84
4,468,367	06/526,517	8/28/84
4,468,369	06/473,816	8/28/84
4,468,375	06/423,898	8/28/84
4,468,378	06/268,202	8/28/84
4,468,381	06/500,730	8/28/84
4,468,403	06/399,994	8/28/84
4,468,422	06/232,880	8/28/84
4,468,425	06/372,917	8/28/84
4,468,426	06/444,086	8/28/84
4,468,427	06/540,984	8/28/84
4,468,429	06/433,144	8/28/84
4,468,436	06/452,555	8/28/84
4,468,447	06/472,004	8/28/84
4,468,452	06/478,568	8/28/84
4,468,456	06/362,805	8/28/84
4,468,462	06/452,168	8/28/84
4,468,468	06/388,298	8/28/84
4,468,475	06/512,511	8/28/84
4,468,486	06/438,556	8/28/84
4,468,492	06/514,139	8/28/84
4,468,495	06/462,078	8/28/84
4,468,499	06/382,301	8/28/84

Patent Number	Serial Number	Issue Date
4,468,509	06/526,665	8/28/84
4,468,511	06/470,890	8/28/84
4,468,512	06/415,122	8/28/84
4,468,513	06/415,207	8/28/84
4,468,520	06/288,075	8/28/84
4,468,524	06/418,874	8/28/84
4,468,531	06/322,347	8/28/84
4,468,532	06/443,827	8/28/84
4,468,536	06/483,017	8/28/84
4,468,550	06/397,826	8/28/84
4,468,554	06/436,595	8/28/84
4,468,559	06/366,349	8/28/84
4,468,561	06/460,258	8/28/84
4,468,562	06/389,430	8/28/84
4,468,564	06/434,834	8/28/84
4,468,566	06/402,228	8/28/84
4,468,575	06/328,876	8/28/84
4,468,579	06/420,093	8/28/84
4,468,583	06/539,759	8/28/84
4,468,591	06/368,500	8/28/84
4,468,610	06/368,427	8/28/84
4,468,613	06/325,536	8/28/84
4,468,615	06/247,338	8/28/84
4,468,627	06/408,284	8/28/84
4,468,632	06/326,152	8/28/84
4,468,635	06/258,704	8/28/84
4,468,651	06/285,625	8/28/84
4,468,660	06/330,250	8/28/84
4,468,664	06/338,839	8/28/84
4,468,669	06/387,098	8/28/84
4,468,674	06/400,978	8/28/84
4,468,675	06/318,011	8/28/84
4,468,690	06/504,650	8/28/84
4,468,699	06/358,985	8/28/84
4,468,700	06/475,557	8/28/84
4,468,709	06/302,090	8/28/84
4,468,715	06/493,084	8/28/84
4,468,720	06/295,620	8/28/84
4,468,738	06/512,564	8/28/84
4,468,743	06/488,674	8/28/84
4,468,746	06/326,390	8/28/84
4,468,752	06/303,942	8/28/84
4,468,756	06/380,244	8/28/84
4,468,760	06/393,246	8/28/84
4,468,764	06/423,724	8/28/84
4,468,765	06/291,505	8/28/84
4,468,766	06/431,981	8/28/84
4,468,774	06/329,214	8/28/84
4,468,775	06/310,335	8/28/84
4,468,781	06/309,482	8/28/84
4,468,783	06/285,514	8/28/84
4,468,785	06/323,599	8/28/84
4,468,788	06/416,997	8/28/84
4,468,789	06/322,112	8/28/84
4,468,790	06/349,233	8/28/84
4,468,791	06/576,466	8/28/84
4,468,792	06/301,706	8/28/84
4,468,794	06/338,396	8/28/84
4,468,795	06/342,028	8/28/84
4,468,800	06/270,366	8/28/84
4,468,804	06/352,958	8/28/84
4,468,812	06/458,463	8/28/84
4,766,614	06/948,230	8/30/88
4,766,616	07/032,608	8/30/88
4,766,617	07/033,655	8/30/88
4,766,618	06/871,230	8/30/88
4,766,621	06/893,716	8/30/88
4,766,622	07/028,736	8/30/88
4,766,626	07/105,812	8/30/88
4,766,634	07/140,558	8/30/88
4,766,635	07/140,737	8/30/88
4,766,639	07/142,121	8/30/88
4,766,641	06/815,392	8/30/88
4,766,650	07/045,068	8/30/88
4,766,660	07/034,675	8/30/88
4,766,661	06/942,294	8/30/88
4,766,675	07/034,033	8/30/88
4,766,680	06/946,530	8/30/88
4,766,682	07/034,627	8/30/88
4,766,686	06/859,274	8/30/88
4,766,689	07/054,231	8/30/88
4,766,690	07/015,668	8/30/88
4,766,693	07/062,432	8/30/88
4,766,694	07/130,102	8/30/88
4,766,695	06/549,058	8/30/88
4,766,698	07/121,130	8/30/88
4,766,700	06/810,489	8/30/88
4,766,705	06/469,736	8/30/88
4,766,709	07/043,024	8/30/88
4,766,711	07/049,014	8/30/88
4,766,718	06/919,219	8/30/88
4,766,729	07/078,020	8/30/88
4,766,736	07/107,733	8/30/88
4,766,740	07/081,388	8/30/88
4,766,745	06/828,627	8/30/88
4,766,748	07/053,076	8/30/88
4,766,749	06/910,400	8/30/88
4,766,754	07/040,080	8/30/88
4,766,755	07/095,763	8/30/88
4,766,756	06/856,798	8/30/88
4,766,760	07/116,454	8/30/88
4,766,765	06/930,197	8/30/88
4,766,772	06/940,955	8/30/88
4,766,775	06/858,683	8/30/88
4,766,777	06/874,197	8/30/88
4,766,778	06/682,664	8/30/88
4,766,781	07/009,878	8/30/88
4,766,784	07/143,584	8/30/88
4,766,785	06/913,085	8/30/88
4,766,791	07/074,696	8/30/88
4,766,794	06/899,677	8/30/88
4,766,803	06/911,036	8/30/88
4,766,804	07/018,273	8/30/88
4,766,811	06/925,813	8/30/88
4,766,813	06/947,446	8/30/88
4,766,835	07/094,868	8/30/88
4,766,837	07/039,882	8/30/88
4,766,838	07/067,976	8/30/88
4,766,840	07/003,123	8/30/88
4,766,844	07/055,495	8/30/88
4,766,846	06/916,371	8/30/88
4,766,848	07/040,591	8/30/88
4,766,849	06/913,272	8/30/88
4,766,850	06/732,296	8/30/88
4,766,851	06/866,051	8/30/88
4,766,856	07/089,499	8/30/88
4,766,861	07/096,898	8/30/88
4,766,869	07/041,148	8/30/88
4,766,871	07/018,530	8/30/88
4,766,874	07/048,245	8/30/88
4,766,875	06/671,063	8/30/88
4,766,886	07/012,357	8/30/88
4,766,897	07/062,865	8/30/88
4,766,904	07/015,618	8/30/88
4,766,914	06/621,613	8/30/88
4,766,920	06/579,679	8/30/88
4,766,923	06/933,048	8/30/88
4,766,930	07/070,567	8/30/88
4,766,934	07/083,112	8/30/88
4,766,941	06/871,846	8/30/88
4,766,955	07/036,727	8/30/88
4,766,960	07/077,634	8/30/88
4,766,964	07/026,174	8/30/88
4,766,979	07/086,396	8/30/88
4,766,982	06/737,383	8/30/88
4,766,998	07/087,208	8/30/88
4,767,000	07/076,319	8/30/88
4,767,006	07/143,839	8/30/88
4,767,013	06/937,054	8/30/88
4,767,014	07/057,396	8/30/88
4,767,023	06/853,741	8/30/88
4,767,027	06/935,527	8/30/88
4,767,028	07/144,368	8/30/88
4,767,029	06/884,008	8/30/88
4,767,034	06/896,038	8/30/88
4,767,035	06/919,406	8/30/88

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4,767,037	06/649,490	8/30/88
4,767,038	07/009,700	8/30/88
4,767,040	07/036,258	8/30/88
4,767,045	07/000,563	8/30/88
4,767,048	06/908,029	8/30/88
4,767,049	06/864,662	8/30/88
4,767,051	06/883,473	8/30/88
4,767,053	07/094,470	8/30/88
4,767,058	06/880,366	8/30/88
4,767,062	07/016,467	8/30/88
4,767,063	07/070,604	8/30/88
4,767,065	07/002,645	8/30/88
4,767,069	07/036,507	8/30/88
4,767,074	06/776,609	8/30/88
4,767,075	07/043,131	8/30/88
4,767,083	06/933,963	8/30/88
4,767,087	07/065,845	8/30/88
4,767,089	07/033,728	8/30/88
4,767,092	07/127,130	8/30/88
4,767,095	07/110,224	8/30/88
4,767,096	07/010,454	8/30/88
4,767,098	07/035,029	8/30/88
4,767,101	06/928,223	8/30/88
4,767,110	06/947,509	8/30/88
4,767,121	06/804,168	8/30/88
4,767,128	07/078,136	8/30/88
4,767,132	07/091,117	8/30/88
4,767,134	07/023,674	8/30/88
4,767,140	07/021,676	8/30/88
4,767,141	07/071,932	8/30/88
4,767,143	07/017,449	8/30/88
4,767,144	07/030,840	8/30/88
4,767,145	06/916,024	8/30/88
4,767,149	07/040,957	8/30/88
4,767,150	06/929,900	8/30/88
4,767,151	07/108,123	8/30/88
4,767,152	07/035,971	8/30/88
4,767,176	07/085,203	8/30/88
4,767,183	06/862,334	8/30/88
4,767,189	06/902,757	8/30/88
4,767,229	07/109,414	8/30/88
4,767,230	07/066,256	8/30/88
4,767,232	07/046,615	8/30/88
4,767,233	07/028,358	8/30/88
4,767,237	07/153,513	8/30/88
4,767,246	06/938,597	8/30/88
4,767,253	06/337,163	8/30/88
4,767,265	06/946,987	8/30/88
4,767,269	06/802,217	8/30/88
4,767,278	06/309,032	8/30/88
4,767,301	07/118,434	8/30/88
4,767,310	07/030,456	8/30/88
4,767,324	07/053,898	8/30/88
4,767,327	06/907,835	8/30/88
4,767,331	07/055,018	8/30/88
4,767,333	07/085,565	8/30/88
4,767,334	06/799,485	8/30/88
4,767,343	07/072,765	8/30/88
4,767,358	07/062,111	8/30/88
4,767,359	07/061,324	8/30/88
4,767,360	07/056,820	8/30/88
4,767,368	07/115,660	8/30/88
4,767,372	07/001,586	8/30/88
4,767,373	06/836,669	8/30/88
4,767,375	07/013,540	8/30/88
4,767,376	06/923,628	8/30/88
4,767,382	07/016,677	8/30/88
4,767,385	07/055,575	8/30/88
4,767,390	07/007,085	8/30/88
4,767,393	06/939,114	8/30/88
4,767,395	07/137,741	8/30/88
4,767,399	06/938,622	8/30/88
4,767,401	06/411,657	8/30/88
4,767,406	06/917,712	8/30/88
4,767,409	06/497,324	8/30/88
4,767,412	07/010,331	8/30/88
4,767,425	07/070,752	8/30/88
4,767,426	07/103,015	8/30/88
4,767,428	06/848,381	8/30/88
4,767,436	07/114,356	8/30/88
4,767,438	07/138,448	8/30/88
4,767,439	07/113,473	8/30/88
4,767,442	06/906,378	8/30/88
4,767,443	06/775,972	8/30/88
4,767,445	07/060,211	8/30/88
4,767,446	06/715,295	8/30/88
4,767,451	07/002,725	8/30/88
4,767,452	06/881,636	8/30/88
4,767,456	07/030,431	8/30/88
4,767,457	06/924,766	8/30/88
4,767,467	06/861,950	8/30/88
4,767,482	06/752,256	8/30/88
4,767,485	06/861,113	8/30/88
4,767,486	06/922,815	8/30/88
4,767,497	07/032,671	8/30/88
4,767,498	07/087,396	8/30/88
4,767,501	06/816,315	8/30/88
4,767,502	07/052,452	8/30/88
4,767,504	07/056,970	8/30/88
4,767,512	06/937,218	8/30/88
4,767,523	07/024,756	8/30/88
4,767,530	07/046,165	8/30/88
4,767,544	06/924,322	8/30/88
4,767,546	06/849,241	8/30/88
4,767,548	06/893,752	8/30/88
4,767,565	07/106,981	8/30/88
4,767,585	07/036,352	8/30/88
4,767,598	06/910,450	8/30/88
4,767,600	06/746,583	8/30/88
4,767,601	06/897,945	8/30/88
4,767,605	06/803,587	8/30/88
4,767,606	06/930,827	8/30/88
4,767,607	07/092,329	8/30/88
4,767,619	06/895,380	8/30/88
4,767,622	06/524,919	8/30/88
4,767,629	07/108,782	8/30/88
4,767,648	07/066,267	8/30/88
4,767,650	07/081,320	8/30/88
4,767,652	06/908,487	8/30/88
4,767,657	06/883,285	8/30/88
4,767,658	07/006,274	8/30/88
4,767,664	06/867,584	8/30/88
4,767,665	06/776,464	8/30/88
4,767,674	06/759,209	8/30/88
4,767,678	06/830,293	8/30/88
4,767,698	07/037,732	8/30/88
4,767,705	06/672,530	8/30/88
4,767,709	06/625,499	8/30/88
4,767,715	07/103,597	8/30/88
4,767,720	06/774,370	8/30/88
4,767,727	06/867,461	8/30/88
4,767,739	07/039,859	8/30/88
4,767,746	06/805,206	8/30/88
4,767,747	06/901,107	8/30/88
4,767,755	07/010,703	8/30/88
4,767,757	07/027,755	8/30/88
4,767,769	07/065,363	8/30/88
4,767,773	06/830,898	8/30/88
4,767,775	06/890,245	8/30/88
4,767,779	06/849,658	8/30/88
4,767,784	06/935,917	8/30/88
4,767,792	07/016,353	8/30/88
4,767,795	07/063,185	8/30/88
4,767,797	06/899,650	8/30/88
4,767,804	06/903,838	8/30/88
4,767,822	07/090,817	8/30/88
4,767,826	06/756,354	8/30/88
4,767,829	07/062,498	8/30/88
4,767,837	06/823,715	8/30/88
4,767,847	06/262,019	8/30/88
4,767,851	06/752,897	8/30/88
4,767,853	06/887,394	8/30/88
4,767,858	07/050,195	8/30/88
4,767,859	06/931,053	8/30/88
4,767,862	07/088,624	8/30/88
4,767,865	07/085,103	8/30/88

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4,767,867	07/036,832	8/30/88
4,767,868	07/036,830	8/30/88
4,767,869	07/080,059	8/30/88
4,767,872	06/824,871	8/30/88
4,767,873	06/905,930	8/30/88
4,767,880	07/066,570	8/30/88
4,767,884	07/097,881	8/30/88
4,767,890	06/931,251	8/30/88
4,767,899	07/027,738	8/30/88
4,767,904	06/828,368	8/30/88
4,767,916	07/068,883	8/30/88
4,767,919	06/842,633	8/30/88
4,767,924	07/087,565	8/30/88
4,767,927	06/765,243	8/30/88
4,767,933	07/076,060	8/30/88
4,767,954	06/850,964	8/30/88
4,767,955	07/081,795	8/30/88
4,767,957	06/939,501	8/30/88
4,767,962	06/881,169	8/30/88
4,767,968	06/662,230	8/30/88
4,767,983	07/000,421	8/30/88
4,767,985	07/131,299	8/30/88
4,767.986	06/933,903	8/30/88
4,767,988	06/877,646	8/30/88
4,767,989	06/813,112	8/30/88
4,767,990	06/879,701	8/30/88
4,767,994	06/905,435	8/30/88
4,767,995	06/940,347	8/30/88
4,767,997	06/875,163	8/30/88
4,768,005	07/030,206	8/30/88
4,768,012	07/115,563	8/30/88
4,768,020	06/863,343	8/30/88
4,768,023	07/025,186	8/30/88
4,768,024	06/885,863	8/30/88
4,768,040	06/925,005	8/30/88
4,768,042	07/009,792	8/30/88
4,768,049	07/002,595	8/30/88
4,768,053	06/945,500	8/30/88
4,768,056	07/098,789	8/30/88
4,768,061	07/017,619	8/30/88
4,768,084	06/911,418	8/30/88
4,768,090	07/093,672	8/30/88
4,768,111	06/891,941	8/30/88
4,768,127	07/104,295	8/30/88
4,768,130	07/106,255	8/30/88
4,768,131	06/937,966	8/30/88
4,768,137	07/081,244	8/30/88
4,768,144	06/904,969	8/30/88
4,768,145	06/675,800	8/30/88
4,768,179	06/900,800	8/30/88
4,768,206	07/040,529	8/30/88
4,768,210	07/081,577	8/30/88
4,768,215	06/863,501	8/30/88
4,768,221	06/920,773	8/30/88
4,768,222	06/893,291	8/30/88
4,768,223	06/837,009	8/30/88
4,768,228	07/096,343	8/30/88
4,768,229	06/887,311	8/30/88
4,768,230	06/849,711	8/30/88

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,353,797	06/240,975	10/12/82	3/05/81	9/23/92
4,680,138	06/790,247	7/14/87	10/22/85	7/31/92
4,680,889	06/802,477	7/21/87	11/27/85	9/24/92
4,693,993	06/744,207	9/15/87	6/13/85	9/09/92
4,697,648	06/782,918	10/06/87	9/24/85	9/11/92
4,755,803	07/054,449	7/05/88	5/27/87	9/11/92

Reissue Applications Filed

Notice under 37 CFR 1.11 (b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21 (b)).

4,876,133, Re. S.N. 07/774,623, Filed Oct. 10, 1991, Cl. 428/64, OPTICAL DATA RECORDING SYSTEM AND METHOD OF PRODUCTION OF RECORDING MEDIUM, Toshinor Suglyama, et. al., Owner of Record: *Hitachi Mavell, Ltd., Osaka, Japan,* Attorney or Agent: William I. Soloman, Ex. Gp.: 1508

4,899,645, Re. S.N. 07/832,715, Filed Feb. 7, 1992, Cl. 454/131, SOLAR POWERED VENTILATOR, Philip Wolfe, et. al., Owner of Record: *Intersolar Ltd., Buckinghamshire, England,* Attorney or Agent: Richard W. Young Esq., Ex. Gp.: 3404

4,973,625, Re. S.N. 07/947,851, Filed Sept. 21, 1992, Cl. 525/74, PLASTIC COMPOSITE BARRIER STRUCTURES, Edward Johnson Deyrup, Owner of Record: *E.I. Du Pont de Nemours and Co., Wilmington, Del.,* Attorney or Agent: Konrad S. Kaeding, Ex. Gp.: 1512

4,986,845, Re. S.N. 07/946,900, Filed Sept. 18, 1992, Cl. 71/92, PYRAZOLE DERIVATIVES AND HERBICIDES CONTAINING THEM, Eiichi Oya, et. al., Owner of Record: *Nissan Chemical Industries Ltd., Tokyo, Japan,* Attorney or Agent: Norman F. Oblon, Ex. Gp.: 1209

5,039,565, Re. S.N. 07/947,607, Filed Sept. 21, 1992, Cl. 428/35.7, PLASTIC COMPOSITE BARRIER STRUCTURES, Edward Johnson Deyrup, Owner of Record: *E.I. Du Pont de Nemours and Co., Wilmington, Del.,* Attorney or Agent: Konrad S. Kaeding, Ex. Gp.: 1508

5,058,920, Re. S.N. 07/949,309, Filed Sept. 22, 1992, Cl. 280/735, METHOD FOR ACTUATING A SAFETY DEVICE FOR VEHICLE OCCUPANTS, Wilfried Burger, et. al., Owner of Record: *Robert Bosch GmbH, Stuttgart, Federal Republic of Germany,* Attorney or Agent: Richard L. Mayer, Ex. Gp.: 3106

5,076,355, Re. S.N. 07/949,735, Filed Sept. 23, 1992, Cl. 166/55.1, PERFORATING GUN WITH AUGER, Joseph F. Donaovan, et. al., Owner of Record: *Baker Hughes Inc., Houston, Tex.,* Attorney or Agent: Steve Rosenblatt, Ex. Gp.: 3506

Requests for Reexamination Filed

Notice under 37 CFR 1.11 (c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19 (a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

D. 324,552, Reexam. No. 90/002,847, Requested Sept. 29, 1992, Cl. D21/146, TOY CROSSBOW, David E. Morrison, Owner of Record: *Saxon Arms, Inc., Tarpon Springs, Fla.*, Attorney or Agent: Basile & Hanlon, Troy, Mich., Ex. Gp.: 2902, Requester: Barnett International, Inc., Odessa, Fla.

4,615,856, Reexam. No. 90/002,844, Requested Sept. 28, 1992, Cl. 264/222, METHOD FOR FORMING AN INDIVIDUALLY CONTOURED CORRECTIVE SEAT FOR A WHEELCHAIR, Michael W. Silverman, Owner of Record: *Inventor, Chicago, Ill,* Attorney or Agent: Thomas E. Hill, Emrich & Dithmar, Chicago, Ill., Ex. Gp.: 1305, Requester: Owner

4,942,086, Reexam. No. 90/002,846, Requested Sept. 28, 1992, Cl. 428/290, TWO-STAGE HEAT RESISTANT BINDERS FOR NONWOVENS, Paul R. Mudge, et. al., Owner of Record: *National Starch & Chemical Corp., Bridgewater, N.J.*, Attorney or Agent: Edwin M. Szala & Ellen T. Dec, National Starch & Chemical Co., Bridgewater, N.J., Ex. Gp.: 1504, Requester: Owner

4,960,215, Reexam. No. 90/002,848, Requested Sept. 30, 1992, Cl. 213/033, FRICTION ELASTOMER DRAFT GEAR, Richard A. Carlstedt, Owner of Record: *Miner Enterprises, Inc., Geneva, Ill.*, Attorney or Agent: John A. Schaerli, Geneva, Ill., Ex. Gp.: 3103, Requester: Cardwell Westinghouse, Chicago, Ill.

5,036,566, Reexam. No. 90/002,845, Requested Sept. 25, 1992, Cl. 024/90C, COVERED ORNAMENTAL CLASP AND APPARATUS FOR ITS PRODUCTION, Elmar Khun, et. al., Owner of Record: *Astor-Werk Otto Berning & Co. (GmbH & Co.), Schwelm, Germany,* Attorney or Agent: Perry Teitelbaum, Goodman & Teitelbaum, Brooklyn, N.Y., Ex. Gp.: 3507, Requester: Owner

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Interference Practice: Matters Relating to Belated Preliminary Motions

In some interference proceedings, evidence which would provide a basis for a preliminary motion under 37 CFR 1.633 does not come to light until after a decision on preliminary motions has been entered. For example, a party may conclude, after hearing the opponent's testimony, that the opponent's application or patent does not comply with the "best mode" requirement of 35 USC § 112, first paragraph; or a prior art reference may be found which the party could not previously have located. The purpose of this notice is to clarify the policy of the Board of Patent Appeals and Interferences as to what steps the party must take if it wishes to have an issue based on such evidence considered by the Board.

If the time for filing preliminary motions has expired, and then evidence comes to light which in the opinion of a party would provide basis for a preliminary motion under 37 CFR 1.633, that party may not simply raise the matter in its brief at final hearing for the Board's consideration. Rather, it is the policy of the Board that it will not consider the matter unless the party files promptly after the evidence becomes available:

(1) the appropriate preliminary motion under 37 CFR 1.633; and

(2) a motion under 37 CFR 1.635 showing sufficient cause why the preliminary motion was not timely filed, as required by 37 CFR 1.645(b). This motion must include the certificate required by 37 CFR 1.637(b).

If either party believes that additional evidence or discovery concerning the matter raised by the motion(s) is necessary, motions (1) and (2) should also be accompanied by or responded to by such other motions as may be appropriate, as for example, motions under 37 CFR 1.651(b) (4) or 1.687(c).

Oct. 6, 1992

SAUL I. SEROTA
Chairman, Board of Patent Appeals and Interferences

United States Postal Service Interruption and Emergency in South Florida

The United States Postal Service (USPS) has informed the Patent and Trademark Office (PTO) that an interruption in its service in South Florida was caused by Hurricane Andrew. Normal postal delivery and collection operations of the USPS were impacted by Hurricane Andrew throughout South Florida to varying degrees from Aug. 23, 1992, through Sept. 12, 1992. By Sept. 12, 1992, the USPS restored delivery and collection operations to all of South Florida with the exception of Homestead.

The PTO is designating the interruption in the service of the USPS in South Florida and the overall destruction caused by Hurricane Andrew as a postal service interruption and an emergency within the meaning of 35 U.S.C. 21(a). Any request to accept a paper or fee delayed by the Hurricane Andrew emergency should be directed to Jeffrey V. Nase, Director, Office of Petitions, (703) 305-9285, PK2-913, for patent-related matters and to Lynne G. Beresford, Trademark Legal Administrator, (703) 305-9464, Pk2-910, for trademark-related matters.

Oct. 7, 1992

DOUGLAS B. COMER
Acting Assistant Secretary and Acting Commissioner of Patents and Trademarks

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Department of Commerce
Patent and Trademark Office
Review of Patent and Trademark Office Appeal Procedures

Agency: Patent and Trademark Office, Commerce
Action: Notice; Extension of Comment Period
Summary: The Patent and Trademark Office is extending the comment period for the Review of Patent and Trademark Office Appeal Procedures to Nov. 30, 1992.
Dates: Written comments must be received by the Office of the Assistant Commissioner for External Affairs, by Nov. 30, 1992. A public hearing will be held on Dec. 1, 1992, at 9:30 a.m. Requests to present oral testimony should be received on or before Nov. 30, 1992.
Addresses: Address written comments and requests to present oral testimony to Michael K. Kirk, Assistant Commissioner for External Affairs, U.S. Patent and Trademark Office, Box 4, Washington, D.C. 20231. The hearing will be held in room 912, on the ninth floor of Crystal Park 2, 2121 Crystal Drive, Arlington, Va. Written comments and a transcript of the hearing will be available for public inspection in room 902 of Crystal Park 2, 2121 Crystal Dr., Arlington, Va.
For Further Information Contact: Michael K. Kirk, Assistant Commissioner for External Affairs, U.S. Patent and Trademark Office, Box 4, Washington, D.C. 20231. (703) 305-9300.
Supplementary Information: The Patent and Trademark Office published a notice and request for public comments in 57 FR 34123 (Aug. 3, 1992) requesting comments on possible changes in the structure and operation of one of the statutory administrative tribunals (boards) within the PTO, namely, the Board of Patent Appeals and Interferences. The comment period was set to close on Nov. 2, 1992. In order to provide sufficient time for the public comment, the comment period is being extended to Nov. 30, 1992, to ensure that all comments are considered. The public hearing has been reset for Dec. 1, 1992, at 9:30 a.m.

Oct. 7, 1992

DOUGLAS B. COMER
Acting Assistant Secretary and Acting Commissioner of Patents and Trademarks

PATENT NOTICES

Certificates of Correction For Week of November 3, 1992

B1. 4,593,760	4,952,705	5,002,503	5,025,293
D. 316,195	4,953,722	5,002,519	5,025,363
D. 316,631	4,954,014	5,002,546	5,025,450
D. 319,275	4,954,999	5,002,577	5,025,708
PP. 7,424	4,956,806	5,002,599	5,025,769
PP. 7,580	4,957,425	5,002,679	5,025,872
Re. 33,286	4,957,554	5,002,681	5,026,056
Re. 33,643	4,957,687	5,002,795	5,026,062
4,716,162	4,960,583	5,002,840	5,026,223
4,727,105	4,960,658	5,003,076	5,026,258
4,744,836	4,964,994	5,003,337	5,026,294
4,748,880	4,965,071	5,003,530	5,026,482
4,775,975	4,966,161	5,003,604	5,026,575
4,782,233	4,966,224	5,004,046	5,026,701
4,793,288	4,966,833	5,004,261	5,026,772
4,802,144	4,968,207	5,004,756	5,027,024
4,803,529	4,970,183	5,005,667	5,027,126
4,811,019	4,970,287	5,005,786	5,027,526
4,815,004	4,971,619	5,005,981	5,028,064
4,817,109	4,971,779	5,006,921	5,028,213
4,822,211	4,973,295	5,006,943	5,028,407
4,832,147	4,973,598	5,007,266	5,028,819
4,841,716	4,974,049	5,007,675	5,028,830
4,842,621	4,974,195	5,008,985	5,028,937
4,844,834	4,975,271	5,009,557	5,029,710
4,849,916	4,975,570	5,009,652	5,030,069
4,851,901	4,983,590	5,010,058	5,030,351
4,853,770	4,983,724	5,010,329	5,030,542
4,854,677	4,983,836	5,010,780	5,031,056
4,855,428	4,983,988	5,011,525	5,031,133
4,860,547	4,985,106	5,011,527	5,031,400
4,863,680	4,985,345	5,011,855	5,032,476
4,865,630	4,985,646	5,012,295	5,033,214
4,866,739	4,986,882	5,012,973	5,033,375
4,866,996	4,987,426	5,013,463	5,033,523
4,868,112	4,987,484	5,013,640	5,034,266
4,870,385	4,987,550	5,013,931	5,035,190
4,873,083	4,988,015	5,014,699	5,035,532
4,874,230	4,988,020	5,014,849	5,035,603
4,874,437	4,988,729	5,015,053	5,035,706
4,876,198	4,988,759	5,015,410	5,036,660
4,880,036	4,989,026	5,015,761	5,036,706
4,881,110	4,989,828	5,015,800	5,037,470
4,894,666	4,990,895	5,015,830	5,037,486
4,895,005	4,991,761	5,017,637	5,038,237
4,895,561	4,992,044	5,018,424	5,038,858
4,897,264	4,992,233	5,018,667	5,039,220
4,901,079	4,992,473	5,018,859	5,039,767
4,901,304	4,992,478	5,019,071	5,039,771
4,904,556	4,992,821	5,019,225	5,039,934
4,906,543	4,992,960	5,019,582	5,040,135
4,907,098	4,993,950	5,019,601	5,040,302
4,907,866	4,994,030	5,020,163	5,040,354
4,909,226	4,994,500	5,020,308	5,040,526
4,911,058	4,944,585	5,020,433	5,040,753
4,912,703	4,994,735	5,020,628	5,040,845
4,915,520	4,994,971	5,021,933	5,040,944
4,917,539	4,994,989	5,022,393	5,040,992
4,917,547	4,995,333	5,022,425	5,041,275
4,925,458	4,995,449	5,023,204	5,041,391
4,926,373	4,995,612	5,023,245	5,041,649
4,928,169	4,996,068	5,023,320	5,041,692
4,929,416	4,996,086	5,023,427	5,041,699
4,932,781	4,996,253	5,023,732	5,041,942
4,932,982	4,997,245	5,023,764	5,042,826
4,933,565	4,997,954	5,023,806	5,043,009
4,940,662	4,998,058	5,023,942	5,043,245
4,940,781	4,998,123	5,024,220	5,044,080
4,940,784	4,998,246	5,024,294	5,044,489
4,943,569	4,998,871	5,024,310	5,077,899
4,944,782	4,999,437	5,024,604	5,093,739
4,949,846	5,000,685	5,024,635	5,094,169
4,950,628	5,001,320	5,024,676	5,106,127
4,951,425	5,001,826	5,024,832	5,110,946
4,952,297	5,001,980	5,024,914	5,111,445
4,952,517	5,002,440	5,025,291	5,119,290
			5,142,572

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

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Box 6	Mail for the Office of Procurement
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Box 171	Vacancy Announcement Applications.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
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Box Assignment	All assignment documents except those filed with new applications.
Box DD	Mail related to Disclosure Documents.
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Box FWC	Requests for File Wrapper Continuation Applications (under 37 CFR 1.62)
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All Communications following the receipt of a PTOL-85. "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee.
Box ITU	All intent to use documents, excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non-Fee-Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection).
Box OED	Mail for the Office of Enrollment and Discipline
Box PATENT APPLICATION	New patent application and associated papers and fees.
Box TRADEMARK	New trademark application and associated papers and APPLICATION fees.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Requests for Reexamination for *original* request papers *only*.
Box Sequence	Submission of diskette for biotechnical application.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
Box Reconstruction	Correspondence pertaining to the reconstruction of lost patent files.

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The following libraries, designated as Patent and Trademark Depository Libraries (PTDLs), receive patent and trademark information in various formats from the U.S. Patent and Trademark Office. Many PTDLs have on file all full-text patents issued since 1790, trademarks published since 1872, and select collections of foreign patents. All PDTLs have both the patent and trademark sections of the *Official Gazette of the U. S. Patent and Trademark Office*. The full-text utility and design patents are distributed numerically on 16 mm microfilm, and plant patents on color microfiche. Patent and trademark search systems on CD-ROM (Compact Disc-Read Only) format are available at all PTDLs to increase utilization of and enhance access to the information found in patents and trademarks. It is through the CD-ROM systems that prelminary patent and trademark searches can be conducted through the numerically arranged collections.

All information is available for use by the public free of charge.

In addition, each PTDL offers reference publications which outline and provide access to the patent and trademark classification systems, as well as other documents and publications which supplement the basic search tools. PTDLs provide technical staff assistance in using all materials. Facilities for making paper copies of patent and trademark information are generally provided for a fee.

Since there are variations in the scope of patent and trademark collections among the PTDLs, and their hours of service to the public vary, anyone contemplating use of these collections at a particular library is urged to contact that library in advance about its collections, services, and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 562-7323
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7010
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles City Library	(213) 612-3273
	Sacramento: California State Library	(916) 654-0069
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 640-8847
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 831-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 806-7252
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 823-2562
	Tampa: Tampa Campus Library, University of South Florida	(813) 974-2726
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Hawaii	Honolulu: Hawaii State Public Library System	(808) 586-3477
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 747-4450
	Springfield: Illinois State Library	(217) 782-5659
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
	West Lafayette: Siegesmund Engineering Library, Purdue University	(317) 494-2873
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
Kansas	Wichita: Ablah Library, Wichita State University	(316) 689-3155
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
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	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Library, University of Michigan	(313) 764-5298
	Big Rapids: Abigail S. Timme Library, Ferris State University	(616) 592-3602
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Mississippi	Jackson: Mississippi Library Commission	Not Yet Operational
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada, Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(908) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
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	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Center for International Trade Development	(405) 744-7086
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
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South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2372
	Clemson University Libraries	Not Yet Operational
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8877
	Nashville: Stevenson Science Library,Vanderbilt University	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 495-4500
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
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Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
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West Virginia	Morgantown: Evansdale Library, West Virginia University	(304) 293-4510
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

EDWARD E. KUBASIEWICZ, Assistant Commissioner
STEPHEN G. KUNIN, Deputy Assistant Commissioner

PATENT EXAMINING GROUPS	Phone Number Area Code 703	New Case Date*
CHEMICAL EXAMINING GROUPS		
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 1100 — D. E. TALBERT, Director	308-0661	11/28/91
ORGANIC CHEMISTRY, GROUP 1200 — JOHN F. TERAPANE, JR., Director	308-1235	2/20/92
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 1300 — DONALD CZAJA, Acting Director	308-0651	1/31/92
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 1500 — J. O. THOMAS, Director	308-2351	1/31/92
BIOTECHNOLOGY, GROUP 1800 — BARRY S. RICHMAN, Acting Director	308-0196	4/19/91
ELECTRICAL EXAMINING GROUPS		
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 2100 — D. G. KELLY, Director	308-1782	5/01/91
SPECIAL LAWS ADMINISTRATION, GROUP 2200 — ROBERT E. GARRETT, Director	308-0511	4/13/91
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 2300 — GERALD GOLDBERG, Director	308-0754	7/18/90
PACKAGES, CLEANING, TEXTILES AND GEOMETRICAL INSTRUMENTS GROUP 2400 — CARLTON CROYLE, Director	308-0771	11/01/91
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 2500 — JOSEPH J. ROLLA, Director	308-0956	8/20/91
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 2600 — BOBBY R. GRAY, Director	305-4700	4/06/91
DESIGN, GROUP 2900 — ROBERT E. GARRETT, Director	308-0511	7/01/90
MECHANICAL EXAMINING GROUPS		
HANDLING AND TRANSPORTATION MEDIA, GROUP 3100 — F. R. SCHMIDT, Director	308-1113	9/28/91
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 3200 — N. GODICI, Director	308-1148	1/31/92
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 3300 — J. J. LOVE, Director	308-0858	12/13/91
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 3400 — JOHN KITTLE, Director	308-0861	1/24/92
GENERAL CONSTRUCTION, PETROLEUM AND MINING ENGINEERING, GROUP 3500 — A.L. SMITH, Director	308-0651	10/29/91

*A communication from the examiner should have been received in most applications filed prior to this date.

Expiration of Patents: The patents within the range of numbers indicated below expire during October 1992 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151

Patents	Numbers 3,909,846 to 3,916,445 inclusive
Plant Patents	3,792 to 3,796

REEXAMINATIONS

NOVEMBER 3, 1992

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,876,375 (1830th)

BIOLOGICAL COMPOSITION FOR USE AS A REFERENCE CONTROL IN DIAGNOSTIC ANALYSIS

Jonas Maurukas, 6823 Lake Ave., Elyria, Ohio 44035

Reexamination Request No. 90/001,633, Nov. 7, 1988.
Reexamination Certificate for Patent No. 3,876,375, issued Apr. 8, 1975, Ser. No. 389,870, Aug. 20, 1973.
Int. Cl.[5] G01N *33/48*
U.S. Cl. 436—16

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **8–22** is confirmed.

Claims **1–7** are cancelled.

8. A process for preparing stable, liquid, biological reference control compositions for use in analysis of naturally occurring biologically similar unknowns, said compositions being stable at −20° C. and capable of extended storage in the liquid stage at said temperature comprising

A. obtaining a portion of biological materials similar in composition to and containing the same component materials as the unknown to be analyzed,

B. freezing said biological material over a period of about 10 to about 24 hours,

C. removing from about 20 to about 40 percent water therefrom,

D. adding at least one alkylene polyol containing from about 2 to about 5 carbon atoms thereto in a concentration substantially the same as the removed water,

E. mixing the components thereof, and

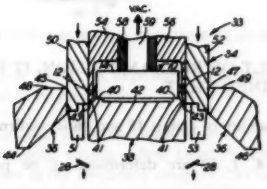
F. reducing the freezing temperature thereof to from about 0° C. to about −20° C.

B1 4,399,610 (1831st)

ASSEMBLING AN ELECTRONIC DEVICE

Harold W. Moyer, Allentown, Pa., assignor to AT&T Technologies, Inc., Arlington, Va.

Reexamination Request No. 90/002,367, Jun. 17, 1991.
Reexamination Certificate for Patent No. 4,399,610, issued Aug. 23, 1983, Ser. No. 249,752, Apr. 1, 1981.
Int. Cl.[5] H01R *93/00*; B23P *23/00*
U.S. Cl. 29—827



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–10** is confirmed.

1. A method of assembling an electronic device attached to a sheet via a plurality of leads, comprising:

detaching from the sheet the device including the leads attached to the device and at least one sheet member interconnecting such leads for maintaining desired spacings therebetween during lead forming;

forming the leads into a given configuration whereby said at least one interconnecting member detached from said sheet continues to maintain the desired spacing between the leads; and then

trimming the at least one interconnecting member from the leads to electrically isolate said leads from each other without substantially disturbing the desired spacings therebetween.

6. Apparatus for assembling an electronic device attached to a sheet via a plurality of leads, comprising:

means for detaching from the sheet the device including the leads attached to the device and at least one sheet member interconnecting such leads for maintaining desired spacings therebetween during lead forming;

means for forming the leads into a given configuration, said at least one interconnecting member maintaining desired spacings between such leads during the operation of the forming means; and

means operable after the operation of the forming means for trimming the at least one interconnecting member from the leads to electrically isolate said leads from each other without disturbing the desired spacings therebetween.

B1 4,648,907 (1832nd)

HIGH COLOR STRENGTH DIARYLIDE YELLOW PIGMENT COMPOSITIONS

Byron G. Hays, Verona, and Robert J. Stanaback, Gladstone, both of N.J., assignors to BASF Corporation, Clifton, N.J.

Reexamination Request No. 90/002,054, Jun. 12, 1990.
Reexamination Certificate for Patent No. 4,648,907, issued Mar. 10, 1987, Ser. No. 722,976, Apr. 12, 1985.
Int. Cl.[5] C09D *11/08*
U.S. Cl. 106—30

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–6** are cancelled.

[1. A method of manufacturing diarylide yellow pigments comprising tetrazotizing 3,3'-dichlorobenzidine, then coupling the tetrazonium salt with an acetoacetarylide, and then filtering and washing the resulting pigment, wherein the improvement comprises:

modifying the tetrazotized 3,3'-dichlorobenzidine by reacting with about 3 mole % to about 5 mole % of an acetic acid solution of a first acetoacetarylide; and

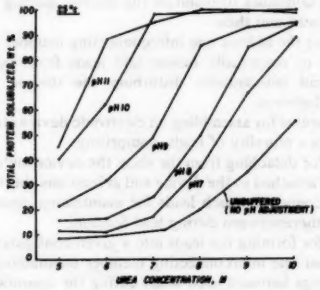
then coupling the modified 3,3'-dichlorobenzidine tetrazonium salt into a slurry of a second acetoacetarylide,

thereby producing diarylide yellow pigment compositions having increased color strength over diarylide yellow compositions produced by conventional methods.**]**

B1 4,652,630 (1833rd)
METHOD OF SOMATOTROPIN NATURATION

Larry A. Bentle, St. Charles; James W. Mitchell, and Stephen B. Storrs, both of St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Reexamination Request No. 90/002,454, Sep. 26, 1991.
Reexamination Certificate for Patent No. 4,652,630, issued Mar. 24, 1987, Ser. No. 704,677, Feb. 22, 1985.
Int. Cl.[5] C07K *1/14, 3/12, 1/02*
U.S. Cl. 530—344



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **10–17** are cancelled.

Claims **1, 3, 4, 9** and **18–20** are determined to be patentable as amended.

Claims **2, 5–8,** and **21–24,** dependent on an amended claim, are determined to be patentable.

New claims **25–51** are added and determined to be patentable.

1. A method for solubilization and naturation of somatotropin protein from refractile bodies of a host cell containing said protein, which method comprises contacting said bodies with an effective amount and concentration of an aqueous urea solution at a pH effective to accomplish solubilization of said protein and then contacting the solution containing said protein with a mild oxidizing agent *at a pH of 9.5 or higher* for a time sufficient to form intramolecular disulfide bonds between cysteine residues contained in said somatotropin protein.

B1 4,775,148 (1834th)
ABDOMINAL EXERCISER

Gary G. McLaughlin, 13300 Wingo St., Arleta, Calif. 91331

Reexamination Request No. 90/002,415, Aug. 23, 1991.
Reexamination Certificate for Patent No. 4,775,148, issued Oct. 4, 1988, Ser. No. 59,,586, Jun. 8, 1987.
Int. Cl.[5] A63B *21/02*
U.S. Cl. 482—124

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **4, 7–9** and **11–14** is confirmed.

Claims **1–3, 5, 6** and **10** having been finally determined to be unpatentable, are cancelled.

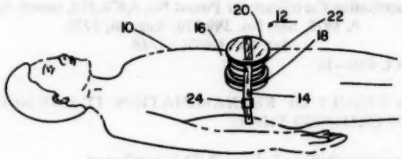
New claims **15–35** are added and determined to be patentable.

17. An abdominal exerciser operable through a range of motion between a contracted abdominal position and an expanded abdominal position of a user comprising;

a contact element for contacting the abdomen of a user;

a retainer element spaced from the contact element away from the body of a user;

a compressible biasing element defining an interior space and mounted between the contact element and the retainer element for resiliently urging the contact element and the retainer element apart;



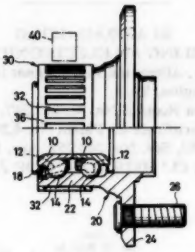
a stabilizing element operable between the retainer element and the contact element for keeping the retainer element and the contact element aligned and the stabilizing element being outside the interior space; and

an adjustable belt attached to the retainer element for passing around the back of a user to retain the retainer element at a fixed, selectable position away from the body of a user.

B1 4,795,278 (1835th)
BEARING ASSEMBLY

Yoshitaka Hayashi, Fujisawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Reexamination Request No. 90/002,435, Sep. 9, 1981.
Reexamination Certificate for Patent No. 4,795,278, issued Jan. 3, 1989, Ser. No. 123,205, Nov. 20, 1987.
Claims priority, application Japan, Nov. 28, 1986, 61-182040[U]; Apr. 1, 1987, 62-77450; Jul. 28, 1987, 62-186665
Int. Cl.[5] F16C *19/52;* **G01P** *3/487;* **H02K** *21/38*
U.S. Cl. 384—448



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **15** and **16** is confirmed.

Claims **1, 4, 7, 12** are determined to be patentable as amended.

Claims **2, 3, 5, 6, 8–11, 13** and **14,** dependent on an amended claim, are determined to be patentable.

New claims **17–37** are added and determined to be patentable.

1. A bearing assembly having an inner ring and an outer ring positioned outside of and concentrically with said inner ring,

with rotatable members therebetween, in which said outer ring is integrally fixed to a rotating member and is rendered rotatable relative to said inner ring, characterized in that:

a pulser gear is fitted on said outer ring, said pulser gear comprises a *circumferentially endless* cylindrical *tubular blank* member of magnetic plate material having *had formed therein* a plurality of through holes [mutually separated along the circumferential direction of a main portion thereof] *spaced uniformly about its entire circumference*, and said pulser gear is fitted on an outer periphery of said outer ring such that portions of said outer periphery of said outer ring constitute respective bottom faces of saidthrough holes,

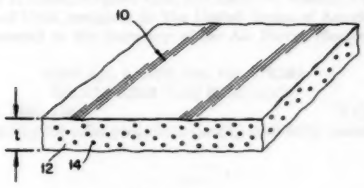
whereby revolution of said rotating member can be detected by a sensor positioned close to said pulser gear.

B1 4,948,922 (1836th)

ELECTROMAGNETIC SHIELDING AND ABSORPTIVE MATERIALS

Vijay K. Varadan, and Vasundara V. Varadan, both of State College, Pa., assignors to The Pennsylvania Research Organization, University Park, Pa.

Reexamination Request No. 90/002,396, Aug. 7, 1991.
Reexamination Certificate for Patent No. 4,948,922, issued Aug. 14, 1990, Ser. No. 252,516, Sep. 30, 1988.
Continuation-in-part of Ser. No. 244,858, Sep. 15, 1988, abandoned
Int. Cl.[5] H05K *9/00*
U.S. Cl. 174—35 GC



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **15–21** is confirmed.

Claims **10, 13** are cancelled.

Claim **1** is determined to be patentable as amended.

Claims **2–9, 11, 12, 14**, dependent on an amended claim, are determined to be patentable.

1. A composite material comprising:

a base material having a first dielectric constant which is complex in the frequency range of 150 megahertz to 100 gigahertz, and being at least partially opaque to electromagnetic energy with frequencies in the range of 150 megahertz to 100 gigahertz, *said first dielectric constant having a ratio of its imaginary part to its real part that is at least equal to or greater than 0.1*; and

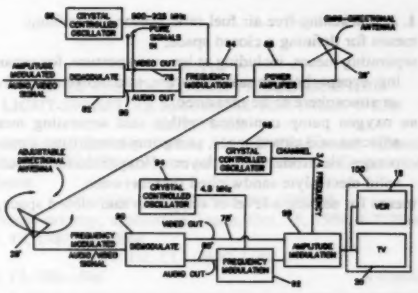
a chiral material having handedness, having a second dielectric constant which is different from the first dielectric constant, and being dispersed throughout the base material.

B1 5,023,931 (1837th)

TELEVISION LOCAL WIRELESS TRANSMISSION AND CONTROL

Donald A. Streck, 832 Country Dr., Ojai, Calif. 93023, and Jerry R. Iggulden, 21600 Cleardale St., Newhall, Calif. 91321, assignors to Donald A. Streck, Ojai and Jerry R. Iggulden, Newhall, both of, Calif.

Reexamination Request No. 90/002,375, Jun. 24, 1991.
Reexamination Certificate for Patent No. 5,023,931, issued Jun. 11, 1991, Ser. No. 457,843, Dec. 27, 1989.
Division of Ser. No. 96,929, Sep. 15, 1987
Int. Cl.[5] H04N *7/00*
U.S. Cl. 455—21



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–7** are cancelled.

[**1**. In a television system including a source of a signal including a video portion modulated onto a first frequency from any of the standard UHF and VHF frequencies used for normal television broadcasting and a television monitor for displaying a video picture, the improvement for wirelessly locally transmitting the video portion of the signal from the source to the monitor comprising:

a) first demodulating means disposed at the source and connected to receive the signal for demodulating the first frequency and for producing the video portion thereof as an output;

b) oscillator means disposed at the source for generating a second frequency above any standard UHF and VHF frequencies used for normal television broadcasting;

c) first modulating means disposed at the source for modulating said second frequency with the video portion of the signal to produce a modulated second frequency signal as an output thereof;

d) amplifying and transmitting means connected to said output of said first modulating means for amplifying and transmitting said modulated second frequency signal from a transmitting antenna;

e) receiving antenna means disposed at the monitor for receiving said modulated second frequency signal;

f) second demodulating means connected to said antenna means for demodulating said modulated second frequency signal as received and for reproducing the video portion of the signal as an output; and,

g) means interconnecting said output of said second demodulating means to the monitor for conducting the video portion of the signal to the monitor to be used thereby in producing a video picture.]

B1 5,047,137 (1838th)

SOLID ELECTROLYTE AIR/FUEL RATIO SENSOR WITH VOLTAGE CONTROL

Tetsusyo Yamada; Takao Kojima; Hiroyuki Ishiguro, and Yoshihide Kami, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Reexamination Request No. 90/002,533, Dec. 4, 1991.
Reexamination Certificate for Patent No. 5,047,137, issued Sep. 10, 1991, Ser. No. 915,839, Oct. 6, 1986.
Claims priority, application Japan, Oct. 5, 1985, 60-222059
Int. Cl.[5] G01N *27/26*
U.S. Cl. 204—425

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–7 is confirmed.

1. A blackening-free air fuel ratio sensor, comprising:

means for defining a closed space,

separating means, including at lest one aperture, for separating, except through said aperature, said closed space from an atmosphere to be measured,

an oxygen pump contained within said separating means adjacent said closed space, said pump comprising a pair of porous electrodes and a layer of oxygenion conductive solid electrolyte sandwiched therebetween,

means for sensing a level of oxygen in said closed space,

a power supply unit for feeding electrical power to said electrodes of said oxygen pump,

means for sensing a voltage, impressed on said oxygen pump by said power supply unit, as information predictive of blackening of said electrolyte, and

means for controlling said power supply unit, in response to said impressed voltage exceeding a predetermined voltage level, to avoid said blackening.

STATUTORY INVENTION REGISTRATIONS

PUBLISHED NOVEMBER 3, 1992

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

H1110
RESIN COMPOSITIONS

Abraham A. Smaardijk, and Arris H. Kramer, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 28, 1989, Ser. No. 458,252

Claims priority, application United Kingdom, Jan. 17, 1989, 8900953

Int. Cl.[5] **B32B** *15/08;* **C08F** *283/00;* **C08G** *18/00, 8/30*

U.S. Cl. 428—460 **14 Claims**

1. A thermosetting resin composition consisting essentially of a polyalcohol, obtained by hydrogenating at least about 20% of the carbonyl groups of a low molecular weight linear alternating polymer of carbon monoxide and at least one straight-chain α-olefin of up to 10 carbon atoms inclusive, and a polyfunctional curing agent.

H1111
MOLD RELEASE TECHNIQUE FOR SOLID PROPELLANT CASTING TOOLING

William F. Dunn, Brigham City, and Larry W. Poulter, Ogden, both of Utah, assignors to The United States of America as represented as the Secretary of the Air Force, Washington, D.C.

Filed Apr. 1, 1991, Ser. No. 678,386

Int. Cl.[5] **B28B** *7/36;* **B29C** *33/56*

U.S. Cl. 249—114.1 **5 Claims**

1. Tooling for solid propellant casting consisting essentially of a shaped, filled polymer or copolymer article having at least one outer layer of cured polyvinyl butyral.

H1112
SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL HAVING A WIDE LATITUDE

Atsuo Ezaki; Keisuke Tobita; Hiroshi Ikeda, and Hideaki Haraga, all of Hino, Japan, assignors to Konica Corporation, Japan

Filed Oct. 16, 1990, Ser. No. 598,550

Claims priority, application Japan, Oct. 18, 1989, 1-272046; Oct. 18, 1989, 1-272048

Int. Cl.[5] **G03C** *1/46*

U.S. Cl. 430—506 **5 Claims**

1. A silver halide color photographic light-sensitive material comprising a support having thereon a red-sensitive silver halide emulsion layer, a green-sensitive silver halide emulsion layer and a blue-sensitive silver halide emulsion layer, wherein said green-sensitive emulsion layer has a three-layered structure, in which a low speed silver halide emulsion layer, medium speed silver halide emulsion layer and high speed silver halide emulsion layer are coated on said support in this order; and the coating amount of silver in the layers increases in the order of the medium speed layer, low speed layer and high speed layer.

STATUTORY INVENTION REGISTRATIONS

PUBLISHED NOVEMBER 2, 1982

A statutory invention registration is not to be construed as, and does not have the effect of, a patent granted under section 151 of title 35, United States Code. For the provisions relating to statutory invention registrations, see section 157 of title 35, United States Code.

Abraham, J. Jeremiah, and Jerry H. Kramer, both of Anaheim, Calif., Beckman Instruments, Inc., Fullerton, Calif. (Assignee), Fluorine Detection H1

Ethyl Corp., Richmond, Va. (Assignee), Jan. 26, 1982, Ser. No. 342,722 ..... H2

Chlorine process, application Filed Jan. 12, 1982, Ser. No. 338,978 ..... H3

Dow Chem. Co., Midland, Mich. (Assignee), Dec. 16, 1980, Ser. No. 216,996 ..... H4

U.S. Cl. 436—90 ..... 14 Claims

1. A fluorescence flow monitoring system comprising in combination a flow cell adapted to be connected to a flowing stream of a fluid containing a fluorescent material, a source of excitation energy for said material, a detector for detecting the intensity of fluorescence emitted by said material in response to said excitation energy, and a flow cell comprising a body member having a bore therethrough, a first window sealingly mounted in said body member at one end of said bore, a second window sealingly mounted in said body member at the other end of said bore, a first fluid passage in said body member communicating with said bore at a point adjacent said first window, a second fluid passage in said body member communicating with said bore at a point adjacent said second window, said first and second fluid passages being adapted to be connected to said flowing stream, said body member having a third fluid passage communicating with said bore at a point between said first and second fluid passages, said third fluid passage being adapted to be connected to said detector, said body member having a fourth fluid passage communicating with said bore at a point between said first and second fluid passages, said fourth fluid passage being adapted to be connected to said source of excitation energy, said body member being adapted to be connected to said flowing stream so that said fluid flows through said bore, said first window being positioned between said source of excitation energy and said bore, said second window being positioned between said bore and said detector, said first window being adapted to transmit said excitation energy from said source to said bore, said second window being adapted to transmit fluorescence emitted by said material in response to said excitation energy from said bore to said detector, said first and second windows being adapted to withstand the pressure of said flowing stream, said first and second windows being adapted to withstand the temperature of said flowing stream, said first and second windows being adapted to withstand the corrosive effects of said flowing stream, said first and second windows being adapted to withstand the abrasive effects of said flowing stream

REISSUES

NOVEMBER 3, 1992

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

RE34,118

Patent Not Issued For This Number

Re. 34,119

METHOD OF HEAT TREATING METAL USING A WASHABLE SYNTHETIC QUENCHANT

Robert W. Foreman, Bloomfield Hills, Mich., and Anthony G. Meszaros, Windsor, Canada, assignors to Park Chemical Company, Detroit, Mich.

Original No. 4,738,731, dated Apr. 19, 1988, Ser. No. 915,427, Oct. 6, 1986. Continuation-in-part of Ser. No. 819,204, Jan. 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 766,598, Aug. 19, 1985, abandoned. Application for reissue Jan. 23, 1989, Ser. No. 302,306

Int. Cl.[5] C21D *1/48*

U.S. Cl. 148—638 **13 Claims**

1. A method of heat treating fabricated metal parts comprising the steps of:

(A) heating the parts to a temperature above a metallurgical transformation range;

(B) placing the parts in a heated, agitated quench bath comprising an aqueous solution of about [10%] *1.75%* to 25% by volume of polyvinylpyrrolidone having a molecular weight in the range of between [900,000 and 3,000,000] *1,270,000 and 2,240,000*;

(C) removing the parts from the quench bath; and

(D) water washing the parts to substantially remove any polymeric film formed on the parts in the quench bath.

Re. 34,120

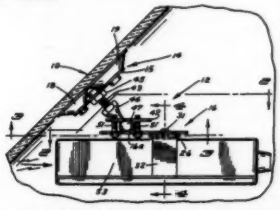
ARTICLE HOLDING BRACKET

Katherine C. Plahn, Maple Grove, Minn., assignor to DF&R Corporation, Farmington Hills, Mich.

Original No. 5,016,850, dated May 21, 1991, Ser. No. 571,177, Aug. 23, 1990. Application for reissue Jul. 2, 1991, Ser. No. 725,753

Int. Cl.[5] F16B *47/00*

U.S. Cl. 248—206.3 **12 Claims**



3. An apparatus adapted for removably mounting an article on an interior surface of the passenger compartment of an automotive vehicle, comprising:

mounting means for operably detachably coupling said apparatus to said interior surface of said passenger compartment;

supporting means for operably detachably engaging said article; and

joint means for operably coupling said mounting means and said supporting means, said joint means including swivel means for selectively controlling the orientation of said supporting means relative to said mounting means along a plurality of rotational axes, said supporting means including a mounting member operably coupled to said joint means and transversely adjustable bracket means shiftably, operably carried by said mounting member for operable engagement of said article, whereby said article is shiftably positionable relative to said mounting member and said mounting member is swivelable relative to said mounting means such that said article is rotationally and transversely positionable relative to said mounting means.

Re. 34,121

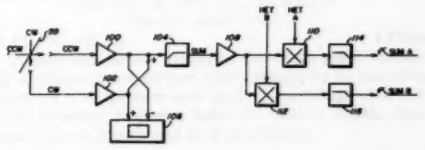
METHOD AND SYSTEM FOR CORRECTING RANDOM WALK ERRORS INDUCED BY RATE REVERSALS IN A DITHERED RING LASER GYROSCOPE

Rodney W. Benoist, Moorpark, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Original No. 4,844,615, dated Jul. 4, 1989, Ser. No. 8,827, Jan. 30, 1987. Application for reissue Jun. 26, 1991, Ser. No. 721,141

Int. Cl.[5] G01C *19/66*

U.S. Cl. 356—350 **23 Claims**



16. A method for producing a signal for measuring rotation of a ring laser gyroscope about a sensing axis in which two waves propagate in opposite directions in a closed cavity and interfere to form an interference pattern that is indicative of the rotation rate of the ring laser gyroscope, comprising the steps of:

producing a pair of heterodyne signals that are indicative of the phase difference between the two counterpropagating light beams;

producing an intensity sum signal indicative of the sum of the intensities of the two waves;

high pass filtering the intensity sum signal;

demodulating the intensity sum signal with the heterodyne signals to produce a demodulated intensity sum signal; and

processing the demodulated intensity sum signal to calculate a correction term that compensates for errors in the rotation rate indicated by the interference pattern at rate reversals of the ring laser gyroscope.

PLANT PATENTS

GRANTED NOVEMBER 3, 1992

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

8,019

ROSE PLANT NAMED 'MORSPRING'

Ralph S. Moore, Visalia, Calif., assignor to Spring Hill Nurseries Company, Tipp City, Ohio

Filed May 3, 1991, Ser. No. 695,433
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—2 **1 Claim**

1. A new and distinct cultivar of climbing rose plant of the Floribunda class substantially as herein described and illustrated, said plant having a vigorous, upright and much branched habit, having buds and flowers which are variegated or striped in varying patterns of red and white, the bud being pointed in the early opening stage (resembling in form 'Little Darling', U.S. Plant Pat. No. 1,581), the flower being full (double) with many (20–25 or more) petals; and further characterized by the plant having repeat bloom, an abundance of large matte foliage, with main stems and shoots of average thorniness, said plant being easy to propagate from soft wood cuttings or by budding, and said plant bearing flowers in small clustes on medium length stems.

8,020

HYBRID MINIATURE ROSE PLANT NAMED BENFIG

Frank A. Benardella, Old Tappan, N.J., assignor to Weeks Wholesale Rose Grower, Inc., Upland, Calif.

Filed Feb. 28, 1991, Ser. No. 664,219
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—7.1 **1 Claim**

1. A new and distinct variety of the miniature rose class, substantially as shown and described.

8,021

NECTARINE TREE NAMED BIG JIM

James W. Taylor, Dinuba, Calif., assignor to Ito Packing Company, Reedley, Calif.

Filed Sep. 25, 1990, Ser. No. 587,854
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—41.1 **1 Claim**

1. A new and distinct variety of nectarine tree with fruit of yellow fleshed cling stone type, substantially as herein shown and described, having a maturity period in the early spring season, having fruit of good sugar content, the fruit being large, essentially round, with deep red color over much of the exterior, particularly when fully mature, with flesh of yellow with reddish tinge, the red being more obvious around the pit and suture line.

8,022

HYBRID RASPBERRY CV. "LAWRENCE"

Stephen Wilhelm, Oakland, Calif., assignor to Sweetbriar Development Inc., Watsonville, Calif.

Filed Jun. 11, 1991, Ser. No. 713,952
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—46.2 **1 Claim**

1. A new vareity of raspberry cv. "Lawrence" as herein illustrated and described.

8,023

GERANIUM PLANT NAMED 'MIDNIGHT BLUSH'

Charles F. Heidgen, 821 Walnut St., Batavia, Ill. 60510

Filed Feb. 13, 1991, Ser. No. 654,571
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—87.12 **1 Claim**

1. A new and distinct variety of Geranium plant, substantially as shown and described, characterized by its cascading growth habit; its medium-sized dark, green foliage with zoning; its abundant blooming habit; its unique, double, light salmon colored flowers and its heat tolerance.

PATENTS

GRANTED November 3, 1992

ERRATA

For CLASS	See PATENT NO.
024-016	5,159,728
024-068	5,159,729
024-543	5,159,730
024-552	5,159,731
024-641	5,159,732
026-093	5,159,733
123-491	5,159,745
052-575	5,159,801
112-262	5,159,874
132-321	5,159,943
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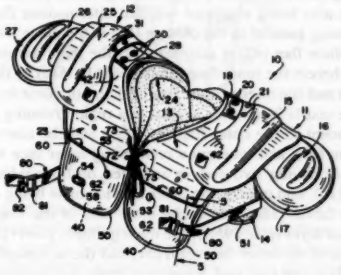
PATENTS

GRANTED NOVEMBER 3, 1992

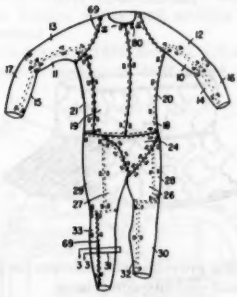
GENERAL AND MECHANICAL

5,159,715
SHOULDER PAD WITH READILY REMOVABLE PADDING
Stanley M. Jurga, Shirley, Mass., and Mike Chen, Taipei Hsien, Taiwan, assignors to Ampac Enterprises, Inc., Shirley, Mass.
Filed May 28, 1991, Ser. No. 705,983
Int. Cl.[5] A41D *13/00*
U.S. Cl. 2—2 **45 Claims**



1. A protective athletic pad comprising a substantially rigid structural member adapted to protect an anatomical body portion of a wearer and a less rigid pad member adapted to be positioned between an inner surface of said rigid structural member and the anatomical body portion of a wearer which is adapted to be protected thereby, means for releasably securing said rigid structural member and said less rigid pad member to each other, and said releasable securing means including pocket means of one of said members for receiving therein a portion of an other of said members.

5,159,716
SURFACE SUIT WITH REMOVABLE WATER AND WIND RESISTANT INSERTS
Allan Takata, 4435 L. Honoapiilani, #118, Lahaina, Hi. 96761
Filed Jul. 3, 1991, Ser. No. 725,515
Int. Cl.[5] A41D *13/00*
U.S. Cl. 2—2.1 R **11 Claims**



1. A garment for a wearer, comprising:
a set of a plurality of flexible, non-airtight garment modules forming a garment, wherein each of said modules includes a pocket defined by a portion of an outer shell and respective separable flaps, said separable flaps forming a lining and connected to said outer shell portion, and
a plurality of flexible, water-resistant pocket inserts that are capable of being placed in and removed from said pockets by separating said flaps.

5,159,717
HAND PADDING DEVICE
Terrence M. Drew; Chris A. Hanson, and Alden B. Hanson, all of Boulder, Colo., assignors to Alden Laboratories, Inc., Boulder, Colo.
Continuation-in-part of Ser. No. 757,955, Oct. 14, 1988, Pat. No. 4,952,439. This application Jun. 13, 1990, Ser. No. 537,055
Int. Cl.[5] A41D *19/00*
U.S. Cl. 2—20 **21 Claims**

21. A method of absorbing and distributing an impacting force, comprising:
(a) placing an enclosure containing flowable material into a glove designed to contain said enclosure, said enclosure having first and second surfaces, at least a portion of said first surface having a preformed first curvature and at least a portion of said second surface having a preformed second curvature, said preformed second curvature curving toward said first surface;
(b) applying a force to said glove in the region of said enclosure;
(c) transferring flexible material within said enclosure, wherein said flowable material in said enclosure flows from the area of the applied force to lower pressure regions within said enclosure;
(d) absorbing a portion of the applied force by the energy required to transfer said flowable material within said enclosure; and
(e) conforming said padding device to portions of a hand located within said glove, causing said impact forces to be distributed over an area of said hand.

5,159,718
SAFETY HUNTER'S GARMENT
Randall S. Moyer, RD #1, Box 328, Bellefonte, Pa. 16823
Filed Oct. 25, 1988, Ser. No. 261,882
The portion of the term of this patent subsequent to Feb. 3, 2008, has been disclaimed.
Int. Cl.[5] A41D *1/08*
U.S. Cl. 2—69 **6 Claims**

1. A hunter's garment providing selectably high visibility for safety and lower visibility for hunting, comprising:
a body portion forming said garment;
said body portion being shaped to conform to a portion of a human figure;
said body portion being formed from a first material having an external appearance of low visibility;
a band area secured to said body portion and selectively encircling said portion of said human figure, said band area having a first area and a second area;
said first area being formed from a second material of high visibility, said first area having a first and second end and being secured to said body portion at said first and second ends, said first area having a first fastening means formed on said first end;
said second area having an outer side and an inner side and

a first end and a second end, said inner side being formed from said second high visibility material, said outer side being formed from said first low visibility material, said first end of said second area being integral with said second end of said first area, said second area being secured to said body portion at said first end, said second end of said second area having a second and third fastening means on each of said inner and outer sides thereof respectively;

wherein when said second fastening means is secured to said first fastening means, said first area is obscured by said second area and said outer side of said second area is exposed and all areas of said high visibility material are obscured;

and wherein when said third fastening means is secured to said first fastening means, said inner area of said second area and said first area are exposed and said portion of said human figure is encircled by said second high visibility material.

5,159,719

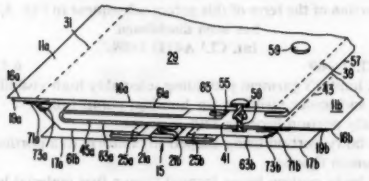
WATERPROOF GARMENT

Hans Aumann, Bruckmühl, Fed. Rep. of Germany, assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Jun. 20, 1991, Ser. No. 718,069

Int. Cl.[5] A41D *3/04*

U.S. Cl. 2—87 **7 Claims**



1. A waterproof garment comprising a textile face fabric (**16***a*, **16***b*), a textile lining (**17***a*, **17***b*) having an inner side, and a waterproof functional layer (**19***a*, **19***b*) having an inner side and an outer side, the waterproof functional layer arranged in between the textile face fabric and the textile lining, the garment being equipped with a re-openable closure (**15**) in the form of a zipper, said garment also being equipped with an outer flap (**29**) which is connected to a main garment part (**11***a*) adjacent to a longitudinal side of the closure, said outer flap having an inner side and an outer side and being located above the closure when the garment is closed, said garment also being equipped with an intermediate flap (**41**) which is connected to a main garment part (**11***b*) adjacent to another longitudinal side of the closure (**15**), said intermediate flap having an outer side and an inner side and being located between the closure (**15**) and the outer flap (**29**) when the garment is closed, the outer sides of the outer flap (**29**) and the intermediate flap (**41**) each consisting of a textile face fabric (**33***a*, **45***a*), the inner sides of the outer flap and the intermediate flap each consisting of inner face laminates (**61***a*, **63***a*) containing a waterproof functional layer, said garment also being equipped with an outer flap seam (**31**) running parallel to the closure (**15**) at the place where the outer flap (**29**) is connected to the main garment part (**11***a*), said garment also being equipped with an intermediate flap seam (**43**) running parallel to the closure (**15**) at the place where the intermediate flap (**41**) is connected to the main garment part (**11***b*), wherein the inner face laminates (**61***a*, **63***a*) of the outer flap (**29**) and the intermediate flap (**41**) do not come in contact with the textile face fabric at least in a region running parallel and adjacent to the outer flap seam (**31**) and the intermediate flap seam (**43**), and wherein a connecting inner face laminate (**61***b*, **63***b*) having two ends is arranged on both sides of the closure (**15**), said connecting inner face laminate being sewn to the face fabric (**16***a*, **16***b*) at the inner side of the waterproof functional layer (**19***a*, **19***b*) of the main garment parts (**11***a*, **11***b*) by means of the outer flap seam (**31**) and the intermediate flap seam (**43**) at one end, said connecting inner face laminate being connected at its other end together with the lining (**17***a*, **17***b*) of the main garment parts (**11***a*, **11***b*) to both sides of the closure (**15**), the surface of the inner face laminate being made of a monofil knit, a waterproof seam tape applied to an obtuse angle formed by the inner side of the functional layer (**19***a*, **19***b*) and the connecting inner face laminate (**61***b*, **63***b*) along the outer flap seam (**31**), a waterproof seam tape applied to acute angles formed by the outer flap (**29**) and the intermediate flap (**41**) and an outer surface of the connecting inner face laminate (**61***b*, **63***b*).

5,159,720

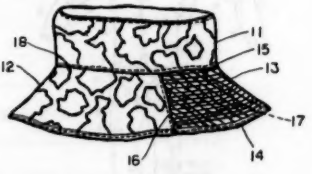
HUNTER'S HAT

Gerald C. Scott, Jr., 1186 Birchcrest Blvd., Port Charlotte, Fla. 33952

Filed Jan. 31, 1992, Ser. No. 829,773

Int. Cl.[5] A42B *1/00*

U.S. Cl. 2—175 **6 Claims**



1. Head wear for providing concealment for the wearer and allowing overhead visibility comprising:

a camouflage colored material crown portion having an edge portion, and

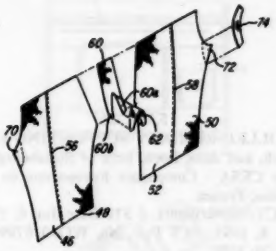
a front brim section extending from said edge portion, said brim section consisting of dull, camouflage colored see-through nylon mesh and having an outer edge, side edges and having an inner edge sewn to said crown edge portion and means for supporting said mesh in an extended position for concealment.

5,159,721

FIREFIGHTER'S TROUSERS PROVIDING EXCEPTIONAL FREEDOM OF LEG MOVEMENT

Karl E. Senser, Camano Island, Wash., and Patricia K. Lewis, Huber Heights, Ohio, assignors to William L. Grilliot and Mary I. Grilliot, both of Dayton, Ohio

Filed Jul. 25, 1991, Ser. No. 735,432
Int. Cl.[5] A41D *1/06*
U.S. Cl. 2—227 3 Claims



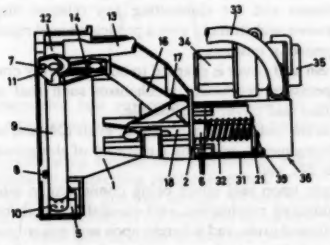
1. A firefighter's trousers comprising firefighting protective material including abrasion resistant material, flame resistant material, thermal barrier material, and moisture barrier material, the firefighter's trousers including a right section and a left section, the right section having a front part and a rear part, the left section having a front part and a rear part, the left section having a torso part and a leg part, the right section having a torso part and a leg part, panel means attaching the right section to the left section and forming a crotch region in the firefighter's trousers between the torso parts and the left parts, the panel means comprising a plurality of pieces in which one of the pieces includes two spaced-apart stems and in which another of the pieces has a part positioned between the spaced-apart stems, whereby the leg parts are readily relatively movable, and whereby there is minimal strain between the leg parts and the torso part of the firefighter's trousers in all positions of the leg parts with respect to the torso parts of the firefighter's trousers, and whereby the firefighter's trousers are comfortable to the wearer thereof in all positions of the leg parts of the firefighter's trousers with respect to the torso parts, and whereby the life of the firefighter's trousers is maximum, and whereby stress with regard to leg movement is minimal in the firefighter who wears the firefighter's trousers.

5,159,722

DRIVE FOR A SHOWER ARM OR A BIDET DEVICE

Alois Diethelm, Tuggen, Switzerland, assignor to Geberit AG., Jona, Switzerland

Filed Apr. 2, 1991, Ser. No. 679,443
Claims priority, application Switzerland, Apr. 3, 1990, 1107/90
Int. Cl.[5] A47K *3/20*
U.S. Cl. 4—420.4 13 Claims



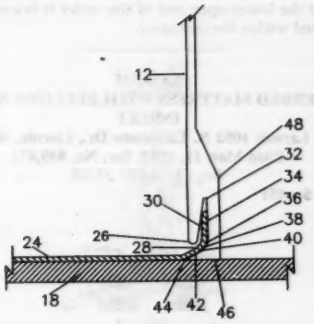
1. A shower arm drive arrangement for a bidet device, comprising: a support, a shower arm having a lengthwise dimension defining a longitudinal direction, said shower arm being displaceably supported by said support for movement in said longitudinal direction between an extended position and a retracted position; drive means for moving said shower arm between said extended position and said retracted position, said drive means including a hydraulic piston cylinder connected to a water main via a valve, said piston cylinder being connected with said shower arm by drive linkage means for transforming a stroke movement of said piston cylinder into said movement in a longitudinal direction of said shower arm, wherein said drive linkage means deflects the stroke movements of said piston cylinder, so that said stroke movement of said piston cylinder is directed approximately perpendicularly to said longitudinal direction of the shower arm.

5,159,723

BATHTUB

Ray B. Benedict, P.O. Box 336, Buffalo Creek, Colo. 80425

Filed Dec. 23, 1991, Ser. No. 812,046
Int. Cl.[5] A47K *3/00*
U.S. Cl. 4—584 7 Claims



1. In a bathtub, a base form for covering the joint formed between a front wall of said bathtub and an adjacent horizontal floor covering surface, said base form is made of the same material as, said bathtub and formed as a one piece construction therewith and extends lengthwise above a lower end of the front bathtub wall, wherein said base form includes an inverted channel with an opening in a front surface at a lower end position of said base form, said channel extending inwardly and upwardly from said opening to provide a smooth, rounded depending lip portion above said channel with an overhanging elevated edge, said further providing a lower smooth upper surface that flares upwardly and inwardly joining a sectionally divided back wall at an obtuse inside angle, said channel and opening being sized to slidably receive an inwardly and upwardly extending edge portion of a floor covering received in said channel and overlapping said lower surface whereby moisture present on the outside of said bathtub wall is directed down along said front wall and will drain downwardly and away from said floor covering edge portion in said channel.

5,159,724

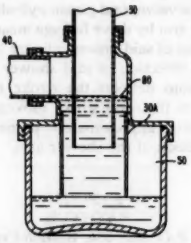
SPILL FREE CLEAN OUT TRAPS

George W. Vosper, 149 Earl Street, Kingston, K7L 2H3, Canada

Continuation-in-part of Ser. No. 67,808, Jun. 30, 1987, Pat. No. 5,095,553, which is a continuation-in-part of Ser. No. 497,204, May 23, 1983, abandoned. This application Nov. 28, 1990, Ser. No. 618,799
Int. Cl.[5] E03C *1/284*
U.S. Cl. 4—679 3 Claims

1. A spill free type trap, comprising a container; a cover sealingly and detachably mounted on said container; a liquid

inlet conduit means extending through said cover and projecting downwardly into the container so that the lower terminal end thereof is faced downwardly from said cover; and a liquid outlet conduit means extending through said cover; said inlet and outlet conduit means being concentric with each other



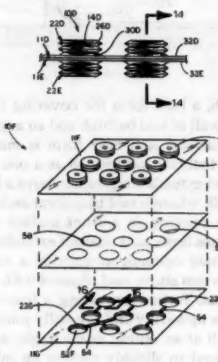
with the outlet conduit means being of larger diameter than the inlet conduit means, said outlet conduit means including a lower terminal end which projects downwardly into the container below the terminal end of the inlet conduit means and such that the lower open end of the outlet is below a normal liquid level within the container.

5,159,725

WATERBED MATTRESS WITH BELLOWS SPRING INSERT

Lynn D. Larson, 1052 N. Lakeshore Dr., Lincoln, Nebr. 68528

Filed Mar. 11, 1992, Ser. No. 849,471
Int. Cl.[5] A47C *27/08*
U.S. Cl. 5—451 **8 Claims**



1. In a waterbed mattress including a top wall, bottom wall and a peripheral sidewall, all interconnected to define a fluid tight chamber, the improvement comprising,

upper and lower spring sections within said chamber,

said upper section comprising a plurality of upper spring bellows units, each upper bellows unit having a bottom opening, a top wall and a pleated sidewall and each unit being collapsible from a normal expanded height to a shortened compressed height wherein the internal volume of the unit is substantially reduced, and means for supporting said plurality of upper bellows units in generally upright spaced apart relation,

said lower section comprising a plurality of lower bellows units, each lower bellows unit having a top opening, a bottom wall and a pleated sidewall and each lower unit being collapsible from a normal expanded height to a shortened compressed height wherein the internal volume of the unit is substantially reduced, and means for supporting said plurality of lower bellows units in generally upright spaced apart relation,

said upper and lower sections being arranged in stacked relation to form stacked pairs of upper and lower bellows units,

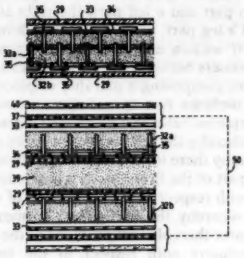
each spring section forming a hydraulic chamber in communication with at least one bleeder opening through one wall of one of said spring sections.

5,159,726

CONTROLLED-RIGIDITY SUPPORTING ELEMENT

Gérard Bloch, and Jean Loeb, both of Strasbourg, France, assignors to CESA - Compagnie Europeenne de Sieges Pour Automobiles, France

PCT No. PCT/FR90/00001, § 371 Date Jul. 8, 1991, § 102(e) Date Jul. 8, 1991, PCT Pub. No. WO90/07890, PCT Pub. Date Jul. 26, 1990
PCT Filed Jan. 2, 1990, Ser. No. 720,520
Claims priority, application France, Jan. 10, 1989, 89 00197
Int. Cl.[5] A47C *7/46*
U.S. Cl. 5—453 **18 Claims**



1. A body supporting cushion having an adjustable rigidity, comprising:

a gastight cover (**29**) adapted to selectively have a controlled inner pressure; and

a filler (**30**) positioned within said cover (**29**) and having a plurality of superposed flexible strata (**31**, **32**, **33**; **33*a***, **32*b***; **34**),

said strata being movable relative to each other when a non-uniform distribution of a force is received by and compresses said filler (**30**) in the absence of said controlled inner pressure in said cover, and

said strata including means located on either side of at least one of said strata for immobilizing said strata when said cover (**29**) is subjected to a change in its controlled inner pressure and for eliminating any relative displacement between said strata to give a predetermined rigidity to said supporting cushion,

wherein said cover is adapted to be operatively connected to a pressure producing mechanism such that a pressure within said cover is adjustable,

said strata including a plurality of grids (**34**) and said immobilizing means including a plurality of elongated members (**35**; **38**), and

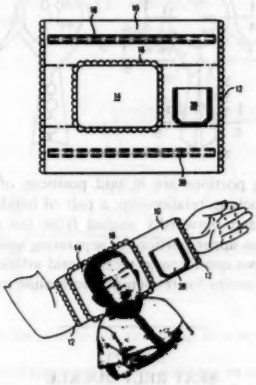
wherein upon said cover being connected to said pressure producing mechanism, said elongated members interlock with said grids, and wherein upon said cover being disconnected from said pressure producing mechanism, said elongated members unlock from said grids.

5,159,727

CHILD CARE BLANKET WITH PILLOW

Jacqueline McCracken, 115 Washington Ave., Kingston, N.Y. 12401

Filed Aug. 29, 1991, Ser. No. 752,022
Int. Cl.[5] A47G 9/00
U.S. Cl. 5—655 4 Claims



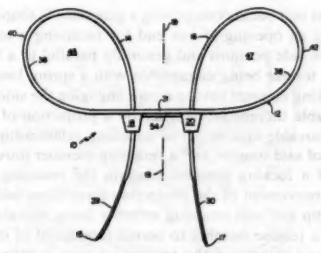
1. A child care device including a blanket, means for mounting a pillow on said blanket substantially inwardly from the periphery of the blanket, and cooperating separable fastener means on spaced portions of the blanket adapted to releasably secure the blanket around a human arm while keeping the pillow exposed to support a baby's head.

5,159,728

TWO-LOOP LAW ENFORCEMENT STRAP RESTRAINT WHICH IS CONCEALABLE, DISPOSABLE AND CAN BE FORMED ENTIRELY OF RECYCLABLE MATERIAL

Richard F. X. Bingold, 8779 Haymarket Rd., Brewerton, N.Y. 13029

Filed Jan. 8, 1991, Ser. No. 638,618
The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.
Int. Cl.[5] E05B 75/00; B65D 63/00
U.S. Cl. 24—16 PB 21 Claims



1. A disposable law enforcement restraint for providing two-loop attachment to limbs of a restrained person comprising:

an elongated strap having first and second stiffly flexible, longitudinally extending ratchet portions,

said strap including first and second latching socket bosses spaced longitudinally of the strap and being located in said strap between said first and second stiffly flexible ratchet portions,

said first and second latching socket bosses including respective first and second socket openings extending therethrough,

first and second resilient latch pawls projecting into said first and second socket openings, respectively, for permitting said first and second ratchet portions of the strap to enter and be moved through the respective first and second socket openings for forming the strap into first and second loops and for thereafter preventing ratchet portions of the strap from being withdrawn from respective socket openings for preventing release of the respective loops, and

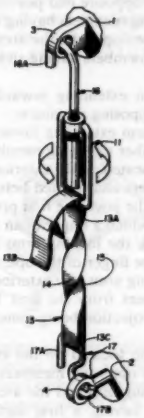
said restraint being molded entirely as an integral structure from engineering grade polymeric material.

5,159,729

TIE-DOWN DEVICE FOR CARGO AND THE LIKE

William T. Walker, 28 Tamela Dr., Little Rock, Ark. 72207

Filed Jul. 12, 1991, Ser. No. 729,333
Int. Cl.[5] F16G 11/12
U.S. Cl. 24—68 CD 21 Claims



1. A tie-down device for securing and holding down cargo and the like, comprising: a turnbuckle, a strap having a first end and a second end, the first and second ends being secured to the turnbuckle, such that the strap loops back on itself at an intermediate portion between the first and second ends thereof, thereby defining a stationary strap between the first end of the strap that is secured to the turnbuckle and the intermediate portion of the strap and a loose strap between the second end of the strap that is secured to the turnbuckle and the intermediate portion of the strap, means carried by the turnbuckle for securing the device on either the cargo and the like to be held down or on an element to which the cargo and the like is to be secured, means carried by the intermediate portion of the strap for securing the device on either the cargo and the like to be held down or on an element to which the cargo and the like is to be secured, wherein rotation of the turnbuckle in a first tightening direction wraps the loose strap around the stationary strap, thereby shortening the loose strap for tightening the device and securing and holding down the cargo and the like, and further thereby locking the loose strap in place, and further wherein rotation of the turnbuckle in a second loosening direction unwraps from around the stationary strap untightening the device without a sudden loss of energy and safely unsecuring and releasing the cargo and the like.

5,159,730

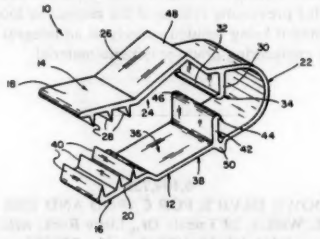
RESILIENT CLIP

Bill Radvin, Olivette, Mo., assignor to Clipps, Inc., Evansville, Ind.

Continuation of Ser. No. 619,249, Nov. 28, 1990, abandoned. This application Oct. 22, 1991, Ser. No. 780,421

Int. Cl.[5] A44B *21/00*

U.S. Cl. 24—543 **13 Claims**



1. A clip comprising:

a body including two opposing members having opposite end portions associated respectively therewith and an arcuate portion joining the two opposing members adjacent one of said opposite end portions at their sides;

each of the opposing members having opposed jaw portions at the end portions opposite the arcuate portion and each of the opposing members having an interior surface and an exterior surface;

a first locking arm extending inwardly from the interior surface of the opposing members;

a second locking arm extending inwardly from the interior surface of the other opposing member;

a first projection located on the exterior surface of one of the opposing members and located between the first locking arm and one of the jaws, the first projection having a first surface against which a finger of an operator is positioned in which to lock the locking arms and a second surface against which the finger of the operator is repositioned to unlock the locking arms, the exterior surface of one of the opposing members from the first locking arm opposite from the first projection being generally smooth and planar; and

a second projection located on the exterior surface of the other one of the opposing members and located between the second locking arm and the arcuate portion, the second projection having a first surface against which a second finger of the operator is positioned in which to lock the locking arms and a second surface against which the second finger of the operator is repositioned to unlock the locking arms, the exterior surface of the other one of the opposing members from the second locking arm opposite from the second projection being generally smooth and planar.

5,159,731

CLOTHESPIN

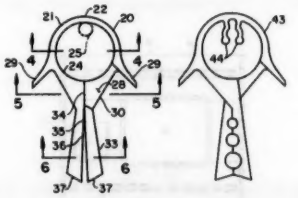
Tod H. Dereadt, 41857 Kentvale, Mt. Clemens, Mich. 48044

Filed Oct. 7, 1991, Ser. No. 772,247

Int. Cl.[5] A44B *21/00*

U.S. Cl. 24—552 **4 Claims**

1. A clothespin comprising: a molded unitary body, said body having a resilient arcuate upper portion, said resilient upper portion having a pair of lower terminal portions for attaching an integral pair of downward extending leg portions; a downward extending leg portion depending from each of said pair of terminal portions, said leg portions being symmetrical and movable from positions of "as molded" non-interlocking relationship to positions of "operative" crossed interlocking relationship, said leg portions having serrated outer surfaces which are in non-abutting relationship in said "as molded" condition and in abutting relationship in said positions of "operative" crossed interlocking relationship for clamping an article of clothing between said leg portions and said leg portions having inner surfaces which are in non-abutting relationship in said "as molded" condition and in non-abutting relationship in said positions of "operative" crossed interlocking relationship; a means for interlocking said leg portions



when said leg portions are in said positions of "operative" crossed interlocking relationship; a pair of handles extending downwardly and outwardly angled from the sides of said arcuate resilient upper portion for separating said leg portions in said operative condition to receive said article of clothing; and a resilient means for retaining a clothesline to said clothespin.

5,159,732

SEAT BELT BUCKLE

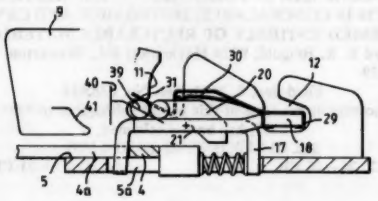
David Burke, Carlisle, Great Britain, assignor to BSRD Limited, Carlisle, Great Britain

Continuation of Ser. No. 484,140, Feb. 23, 1990, abandoned. This application Jul. 22, 1991, Ser. No. 734,067

Claims priority, application United Kingdom, Feb. 23, 1989, 8904205

Int. Cl.[5] A44B *11/26*

U.S. Cl. 24—641 **17 Claims**



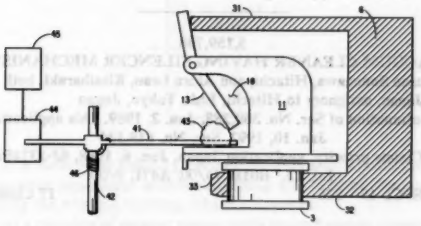
1. A seat belt buckle comprising a generally U-shaped frame, presenting an opening at one end for receiving a tongue between two side portions and generally parallel to a base portion, said tongue being engageable with a spring loaded ejector, a locking element having means engaging the side portions to be tiltable therebetween whereby a projection of said element is movable into or out of a locking relationship with an aperture of said tongue, and a retaining member movable into or out of a locking position wherein the retaining member prevents movement of the projection away from said locking relationship and said retaining member being movable by the action of a release member to permit movement of its locking element and release of the tongue wherein a spring loaded rocking member is pivotally carried on and movable about a fixed axis said tiltable locking element such that a spring loading of said rocking member acts in a sense to urge the rocking member into said position of engagement to constrain said retaining member to said locking position thereof and the release member having first means for moving the rocking member against said spring loading and second means operable to effect displacement of the retaining member from its locking position.

5,159,733

TENTER-TYPE STRETCHER HAVING MEANS FOR DETECTING CLIP OBSTRUCTIONS

Robert L. Fleming, Jr., Hendersonville; Walter F. Hart, Jr., Pisgah FOrest; Edward V. Lindall, Jr., Rosman; Ronnie D. Reid, Lake Taxaway, all of N.C., and John A. Stewrat, III, Pickerington, Ohio, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 2, 1991, Ser. No. 769,855
Int. Cl.[5] D06C *3/04*
U.S. Cl. 26—93 **10 Claims**



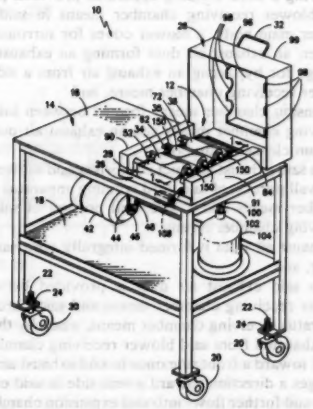
1. A tenter for widthwise stretching of a web of material, comprising:
   a) at least two spaced apart rails defining an entrance and an exit of said tenter, said rails diverging from one another from said entrance to said exit;
   b) a plurality of clips, each of said clips having means for releasably engaging a slevedge edge of a web of material;
   c) means for propelling said clips along said rails; and
   d) means for detecting obstructions within said clips while the clips are not engaged with a web of material.

5,159,734

APPARATUS FOR CLEANING ROLLS

Riley S. Whitt, Spartanburg, S.C.; William L. Bridges, Lynn, N.C., and Marshall L. Johnson, Spartanburg, S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Continuation of Ser. No. 605,807, Oct. 30, 1990, abandoned. This application May 13, 1992, Ser. No. 884,869
Int. Cl.[5] A46B *13/02*
U.S. Cl. 15—883 **21 Claims**



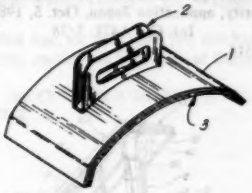
1. An apparatus for cleaning rolls comprising:
   (a) a container;
   (b) a first cylindrical roller brush rotatably mounted about a fixed axis within said container in a substantially horizontal plane and said first cylindrical roller brush has a first and a second end portion;
   (c) a second cylindrical roller brush rotatably mounted in said substantially horizontal plane and in spaced relationship from said first cylindrical roller brush within said container and said second cylindrical roller brush has a first and a second end portion;
   (d) a third cylindrical roller brush rotatably mounted about a fixed axis below said substantially horizontal plane and between said first cylindrical roller brush in frictional contact therewith and said second cylindrical roller brush in frictional contact therewith such that one of said rolls can be supported by said first, second and third cylindrical roller brushes for cleaning within said container and said third cylindrical roller brush has a first and a second end portion;
   (e) a means for rotating said first roller brush in a first rotational direction and a means for rotating said second roller brush in said first rotational direction thereby rotating said third roller brush in a second rotational direction opposite to said first rotational direction.

5,159,735

DEVICE FOR CLEANING TOILET SEATS

Dolores Owens, 3967 Bellview St., Metairie, La. 70002, and Evelyn Cory, 968 W. Seventh St., Upland, Calif. 91786

Filed Sep. 24, 1990, Ser. No. 586,799
Int. Cl.[5] A47L *13/17*
U.S. Cl. 15—104.94 **12 Claims**



1. A device for cleaning toilet seats comprising a hand-holdable curved shaped support means, said support means having a face (, said face having) with at least one dimension substantially as wide as the annular width of a toilet seat, said face further being made of a flexible material which curves in a manner to conform with the curved top surface of a toilet seat and further comprising absorbent material attached to and substantially covering said face.

5,159,736

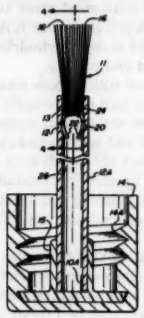
BRUSH CONSTRUCTION

Robert L. Newell, West Paterson, N.J., assignor to Andor Brush Company, West Paterson, N.J.

Filed Jun. 17, 1991, Ser. No. 716,530
Int. Cl.[5] A46B *3/16*
U.S. Cl. 15—195 **9 Claims**

1. An applicator brush comprising:
   a tubular handle having an internal bore having a predetermined uniform diameter extending the length of said tubular handle,
   said tubular handle being open at least at one end thereof,
   a tuft having a predetermined number of bristles,
   said tuft of bristles being reversely folded about an intermediate fold whereby the intermediate fold is adapted to be inserted into said open end of said tubular handle,
   and a resilient plastic filament reversely folded about said tuft of bristles at said intermediate fold and having a length greater than the cross section of said internal bore, said reversely folded plastic filament having opposed free

ends positioned for insertion into said open end of said tubular handle whereby the inherent resiliency of said reversely folded plastic filament about said tuft of bristles



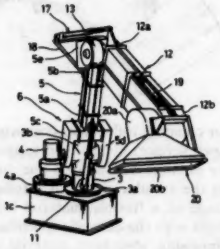
exerts a positive lateral retaining force against the internal surface of said bore at said open end for securing said tuft of bristles within said open end.

5,159,737

DUST COLLECTION APPARATUS

Hiroyoshi Kimura, Shizuoka, and Shinroku Nishiyama, Hyougo, both of Japan, assignors to Nippon Metal Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 417,421, Oct. 5, 1989, abandoned. This application Nov. 4, 1991, Ser. No. 787,266
Claims priority, application Japan, Oct. 5, 1988, 63-130807
Int. Cl.[5] A47L *5/38*
U.S. Cl. 15—314 **3 Claims**



1. A dust collection apparatus comprising a base duct having a lower end adapted to be connected to a vacuum source, and an upper end, an adapter duct having a lower end rotatably mounted on the upper end of the base duct about a vertical axis and an upper end, first drive means for rotating the adapter duct, a first duct arm having a lower end and an upper end formed to be two branches respectively, said first duct arm being pivotally connected to the upper end of the adapter duct to swing up and down about a horizontal axis and formed substantially rectangular in cross section and made of steel plates, a first connecting mechanism for connecting the adapter duct and the first duct arm, second drive means for swinging the first duct arm, a second duct arm having a base end pivotally connected to the upper end of the first duct arm and a forward end, a second connecting mechanism for connecting the first duct arm and the second duct arm, third drive means for swinging the second duct arm, a hood arm having a base end connected to the forward end of the second duct arm and a forward end opened for suction, and a third connecting mechanism for connecting the second duct arm and the hood arm, characterized in that:

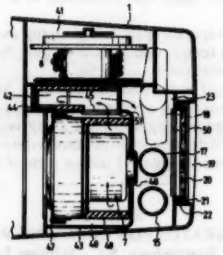
the first connecting mechanism comprises cylindrical holders projecting from the adapter duct in a horizontal direction to have suction passages therein communicating with a suction passage of the adapter duct, two branches of substantially U-shape formed with the lower end of the first duct arm and having suction passages therein, said each branch being provided with an opening in which the cylindrical holder is inserted rotatably, air tight means positioned between each of the openings of the branches and the cylindrical holders, a shaft penetrating the two branches and the adapter duct along a common axis of the cylindrical holders for rotatably connecting the first duct arm to the adapter duct while communicating the suction passages of the two branches with the passage of the adapter duct, and support means arranged in the adapter duct for supporting the shaft.

5,159,738

VACUUM CLEANER HAVING SILENCER MECHANISM

Masao Sunagawa, Hitachi, and Akira Iwao, Kitaibaraki, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 360,288, Jun. 2, 1989. This application Jan. 10, 1992, Ser. No. 819,134
Claims priority, application Japan, Jun. 6, 1988, 63-137459
Int. Cl.[5] B01D *46/00*; A47L *9/00*
U.S. Cl. 15—326 **17 Claims**



1. A vacuum cleaner having a silencer mechanism comprising:

a vacuum cleaner main body,

a blower receiving chamber means for receiving an electric driven blower provided in said vacuum cleaner main body,

a cord winding apparatus receiving chamber means for receiving a cord winding apparatus provided parallel to said blower receiving chamber means in said vacuum cleaner main body, a blower cover for surrounding said blower, an exhaust air duct forming an exhaust air flow passage for bypassing an exhaust air from a side of said blower receiving chamber means, and

an expansion chamber means formed between said blower receiving chamber means and an exhaust air port of said vacuum cleaner main body,

wherein said exhaust air duct comprises said blower cover a side wall portion of said cord winding apparatus receiving chamber means and a side wall portion of said blower receiving chamber means,

said exhaust air duct is formed integrally with said blower cover, and

wherein said exhaust air duct is provided between said blower receiving chamber means and said cord winding apparatus receiving chamber means, whereby the exhaust air exhausted from said blower receiving chamber means flows toward a front side once in said exhaust air duct and changes a direction toward a rear side in said exhaust air duct, and further flows into said expansion chamber means and is exhausted from said expansion chamber means through said exhaust air port of said vacuum cleaner main body.

5,159,739

SANITARY EQUIPMENT HANDLER HAVING MAGNETICALLY HELD, DETACHABLE HANDLE

Raphael A. Adinolfi, 515 - 72 St., Brooklyn, N.Y. 11209

Filed Jun. 25, 1991, Ser. No. 720,363

Int. Cl.[5] A47B *95/02*; E05B *47/00*

U.S. Cl. 16—114 R **5 Claims**

1. A device for opening cabinet drawers and repositioning operating equipment without touching and thereby contaminating the existing handles, which comprises:

(a) a plurality of magnet means, each magnet means comprising a magnet embedded in an encasement, and which are attached to said cabinet drawers and to the handles of said other movable operating equipment; and

(b) a sterilizable element which is held in the hand, for contacting said magnet means for opening said drawers and moving said equipment; said magnet means having a sufficient attracting force on said sterilizable element to move said drawers and said equipment; said sterilizable element having a substantially planar contact surface for contacting and readily attaching to a substantially planar contact surface of the magnet means within a range of positions along said magnet means contact surface.

5,159,740

HINGE WITH SPRING COUPLING MEMBER

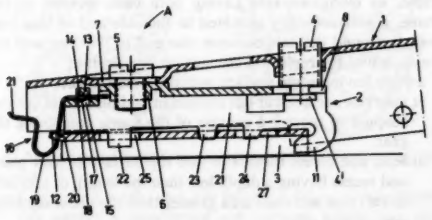
Klaus Brüstle, Höchst; Andreas Töfferl, Hard, and Erich Röck, Höchst, all of Austria, assignors to Julius Blum Gesellschaft m.b.H., Höchst, Austria

Filed May 2, 1991, Ser. No. 694,946

Claims priority, application Fed. Rep. of Germany, May 19, 1990, 9005706[U]

Int. Cl.[5] E05D *7/10*

U.S. Cl. 16—258 **17 Claims**



1. A hinge comprising:

a mounting plate;

a hinge arm;

a longitudinal intermediate member having a U-shaped transverse cross-sectional configuration;

said hinge arm being retained on said intermediate member by depth and joint adjustment devices;

said intermediate member being retained on said mounting plate by means of respective retaining elements located at two positions spaced longitudinally of said intermediate member and said mounting plate;

said retaining elements at a first said position being rigid and defining a pivot axis about which said intermediate member is pivotable relative to said mounting plate;

said retaining element of said intermediate member at a second said position comprising a resilient member such that, when said intermediate member pivots about said pivot axis toward said mounting plate, said resilient member snaps into engagement with said retaining element of said mounting plate at said second position, thereby mounting said intermediate member and said hinge arm on said mounting plate;

said resilient member comprising a leaf spring having means for engaging said retaining element of said mounting plate at said second position; and

said leaf spring and said intermediate member having cooperating structure anchoring said leaf to said intermediate member, said cooperating structure comprising a bridging portion of said intermediate member spaced from the remainder of said intermediate member and defining therebetween a gap, an end portion of said leaf spring inserted into said gap, and a flap extending from said end portion of said leaf spring and abutting said intermediate member, thus preventing withdrawal of said end portion of said leaf spring from said gap.

5,159,741

MACHINE FOR THE MACHINING OF METAL

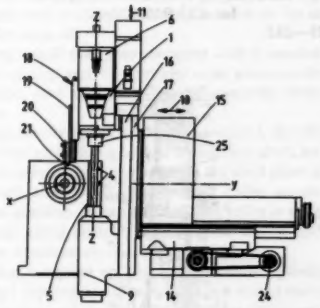
Friedrich A. Garschagen, Remscheid, and Hans-Udo Heym, Wuppertal, both of Fed. Rep. of Germany, assignors to Wera-Werk Hermann Werner GmbH & Co., Wuppertal, Fed. Rep. of Germany

Filed Apr. 19, 1991, Ser. No. 688,926

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1990, 4013327

Int. Cl.[5] B23B *5/36*; B23C *1/18*

U.S. Cl. 29—27 R **15 Claims**



1. A machine for the cutting machining of metal with workholder and toolholder rotating in positive drive with respect to each other, the axis (z) of which extending askew to the workholder axis of rotation (x) can be swung and locked in position around an axis (y) which intersects the axis of rotation (x) of the workpiece and the axis (z) of the toolholder at right angles, the toolholder being displaceable in the direction of the axis of rotation (x) of the workholder and of the axis of swing (y) of the toolholder, characterized by two individual drives (6, 7) for workholder (2) and toolholder (5), which drives are connected by an electronic positive drive device (13) and can each be disconnected from it, the toolholder (5) on its part being seated on a tool slide (16) which is displaceable along the axis (z) of the toolholder and on which, in addition, there is arranged a supplementary toolholder (18) which can be brought

into working position by relative movement to the tool slide (16).

5,159,742

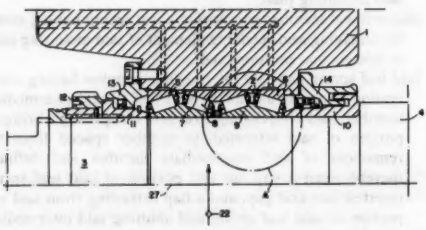
ROLLING MILL WITH A MULTI-ROW BEARING

Heinrich Winter, Schweinfurt, Fed. Rep. of Germany, assignor to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Oct. 31, 1990, Ser. No. 606,702

Int. Cl.[5] B21B *31/08*

U.S. Cl. 29—129 **10 Claims**



1. A rolling mill having a work roll rotatably supported in a housing by a multi-row bearing means, said bearing means including a plurality of outer rings mounted in a bore of the housing supported in the direction of its radial load by way of an oil film means, and means for torsion-proofing said outer rings with respect to each other by projections on end surfaces of said outer rings which engage in recesses in the end surface of a respective adjacent outer ring, at least one of said rings being torsion-proofed with respect to the housing by at least one further projection engaging in a recess in the housing.

5,159,743

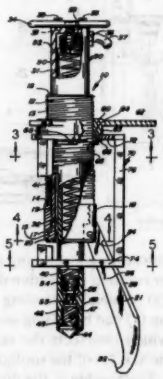
HYDRAULIC PULLER

Dean S. Somerville, McHenry, N. Dak., assignor to Posi Lock Puller, Inc., Cooperstown, N. Dak.

Filed May 8, 1989, Ser. No. 349,078

Int. Cl.[5] B25B *27/02*

U.S. Cl. 29—252 **3 Claims**



1. A hydraulically powered backing puller device for pulling a gear from a shaft, comprising:

a base assembly including an elongated cylindrical housing having an externally threaded portion, an open butt end and an open head,

said base assembly including an anchor ring operatively secured to said cylindrical housing at the head end thereof,

at least two claw members pivotally mounted on said anchor ring in a radial fashion with respect to the longitudinal axis of said cylindrical housing for engagement with the gear to be pulled,

a camming assembly selectively movably mounted on said cylindrical housing,

said camming assembly including a mooring ring selectively threadably mounted on said externally threaded portion of said cylindrical housing,

said camming assembly including a non-rotatable cam ring means operatively secured to said mooring ring whereby threadable rotation of said mooring ring causes axial movement of said cam ring means with respect to said cylindrical housing,

said cam ring means being operatively secured to said claw members whereby axial movement of said cam ring means causes said claw members to pivotally move,

and an elongated hydraulic cylinder means extending into said open butt end of said housing and being selectively removably mounted therein whereby said hydraulic cylinder means may be removed from said housing for repair or replacement without the disassembly of other components of the puller,

said hydraulic cylinder means having a ram movably extending through the head end of said cylindrical housing for engagement with the end of the shaft upon which the gear is mounted.

5,159,744

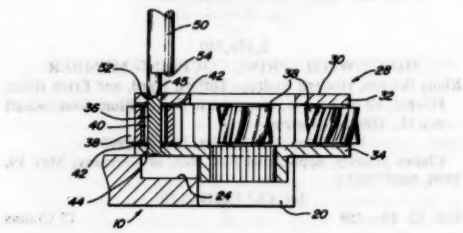
TOOLS FOR REPAIRING PLANETARY GEARS

Matthew M. Stewart, 9794 Country Oaks Dr., Ft. Myers, Fla. 33912

Filed Jan. 24, 1992, Ser. No. 825,569

Int. Cl.[5] B23P *19/04*

U.S. Cl. 29—275 **20 Claims**



1. For use with a planetary gear system of the type having a frame, an elongated axle having both ends secured to the frame, a gear rotatably mounted to the axle and at least one washer around the axle between one end of the gear and the frame, a tool for replacing the washer comprising:

a plate having a top surface and a bottom surface,

at least one arcuate cut-out formed in said plate, said cut-out adapted to receive a portion of the frame containing the gear,

at least one recess formed in said top surface of said plate, said recess having a depth less than the length of said axle and a cross sectional area greater than the cross sectional area of said axle,

an elongated punch adapted to register with an upper end of the axle so that, with a lower end of the axle in registration with said recess and the punch in registration with the upper end of the axle, the punch is used to drive the axle into the recess to thereby enable removal of the washer,

at least one raised nub on the top surface of said plate, said nub adapted to register with a lower end of the axle, and

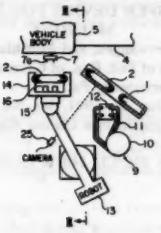
a staking tool for staking the upper end of the axle after replacement of the washer.

5,159,745

ROBOTIC APPARATUS AND METHOD FOR AUTOMOBILE ASSEMBLY

Hisao Kato, Inazawa City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 13, 1990, Ser. No. 492,855
Claims priority, application Japan, Mar. 29, 1989, 1-76983
Int. Cl.[5] B23Q *17/00*
U.S. Cl. 29—407 **17 Claims**



13. A robotic assembly method comprising the steps of:

generating positional information concerning the object at a first fixed station;

moving a robot to the first station and controlling the robot to perform an operation on an object at the first station based on the positional information; and

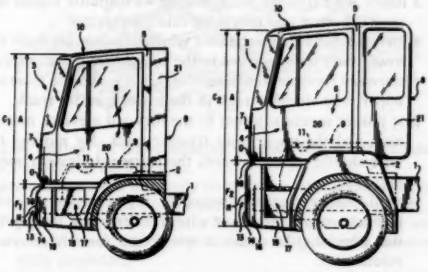
generating positional information concerning an object at a discrete second fixed station separate from the first station while the robot is performing an operation at the first station.

5,159,746

METHOD OF ASSEMBLING HEAVY MOTOR VEHICLES

Luigi Saggese, Turin, Italy, assignor to Iveco, Fiat S.p.A., Turin, Italy

Filed Sep. 30, 1988, Ser. No. 414,757
Claims priority, application Italy, Sep. 30, 1988, 67877 A/88
Int. Cl.[5] B60R *27/00*
U.S. Cl. 29—467 **6 Claims**



1. A method of assembling a motor vehicle comprising the steps of:

(a) providing a cab, said cab having a driver compartment (3), having a preselected and constant height (A), and including side panels (4), each side panel being defined by a closed frame (5) and a door (6), a front panel (7) and a rear panel (8);

(b) providing a plurality of vehicle frames (1) each frame having a different height;

(c) providing a plurality of shields, each shield having a different height (F1, F2) corresponding to the heights of the said vehicle frames and having a continuous fascia (13), a central portion (14) disposed below the front panel (7), and a pair of side portions (15) disposed under the side panels;

(d) selecting one of said plurality of vehicle frames;

(e) mounting said cab on said one vehicle frame;

(f) selecting one of said plurality of shields, said one shield having a height corresponding to that of said one vehicle frame;

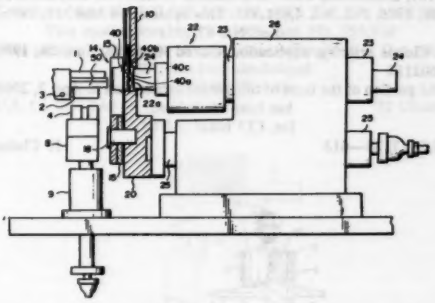
(g) mounting said one shield to said one frame.

5,159,747

FILM CARTRIDGE PRODUCING METHOD

Haruo Ichikawa; Sanpei Iida, and Koichi Takahashi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 529,691, May 29, 1990, abandoned, which is a continuation of Ser. No. 379,734, Jul. 13, 1989, abandoned, which is a continuation of Ser. No. 154,255, Feb. 10, 1988, abandoned. This application Aug. 14, 1991, Ser. No. 746,146
Claims priority, application Japan, Feb. 10, 1987, 62-29235
Int. Cl.[5] B21D *39/00*
U.S. Cl. 29—512 **1 Claim**



1. A method of producing a film cartridge having a hollow cylindrical shell and caps mounted on ends of the shell, comprising the steps of:

bringing a shell plate into abutment with a mandrel having a substantially perfectly circular cross section with a flat top portion, said shell plate having upwardly bent end portions;

bending the shell plate around the mandrel, thereby forming the shell plate into a hollow cylindrical shell, by forcing a bending roller into contact with the shell plate at a station in such a way that said bending roller moves from an initial position, where said bending roller is not proximate to said mandrel, to a final position where said bending roller is proximate to said mandrel;

mounting a cap on an end of the hollow cylindrical shell using a capping and clinching device at said station in such a way that said capping and clinching device moves form an initial position where said capping and clinching device is not proximate to said mandrel to a final position where said capping and clinching device is proximate to said mandrel, while the hollow cylindrical shell is on the mandrel at said station;

clinching the cap to the hollow cylindrical shell at said station using said capping and clinching device at said final position, while said hollow cylindrical shell is grasped from the outside of said hollow cylindrical shell by chuck halves of said capping and clinching device; and

continuously maintaining the mandrel stationary as compared to the moving bending roller and the moving capping and clinching device;

wherein said mounting and clinching steps include sub-steps of:

supplying a cap to a cap-guiding means at the side opposite to the mandrel using a cap-conveying means;

after the cap reaches the end of the cap-conveying means, inserting the cap into the hollow cylindrical shell via the cap-guiding means and, after the cap stops at a predetermined position, deforming the cap from inside of said hollow cylindrical shell plate into contact with an inner surface of said hollow cylindrical shell using a clinching means, while said chuck halves hold the cap, by grasping the hollow cylindrical shell into which the cap is located, from outside of said hollow cylindrical shell, thereby preventing said cap from deforming during clinching; and

positioning the cap with respect to both radial and axial directions of the mandrel using said cap-guiding means.

5,159,748

METHOD AND APPARATUS FOR MANUFACTURING A SURGE ARRESTER

Rodney M. Doone, 77B Folders Lane, and Henry J. Colbert, "Greenfields", 6 Folders Lane, both of Burgess Hill, West Sussex, England

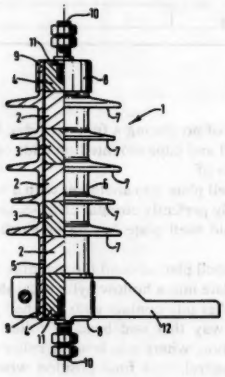
Continuation of Ser. No. 489,862, Mar. 5, 1990, Pat. No. 5,003,689, which is a continuation of Ser. No. 366,842, Jun. 15, 1989, abandoned, which is a division of Ser. No. 924,486, Oct. 29, 1986, Pat. No. 4,851,955. This application Mar. 21, 1991, Ser. No. 672,931

Claims priority, application United Kingdom, Jan. 29, 1986, 8602112

The portion of the term of this patent subsequent to Apr. 2, 2008, has been disclaimed.

Int. Cl.[5] H01C *17/02*

U.S. Cl. 29—613 **19 Claims**



1. A method of manufacturing a gapless surge arrester comprising an elongate rigid core constituted by a stack of varistor blocks held in electrical contact between first and second terminal blocks by virtue of said varistor blocks and terminal blocks being encased within a rigid shell of reinforced rigid plastic material bonded to peripheral surfaces of said terminal blocks, and a shedded outer housing for said core comprising a preformed sleeve of one of polymeric heat-shrink material and elastomeric material fitted tightly onto said core, interfaces between said varistor blocks and said terminal blocks and said encasing shell and between said shell and an outer housing of said surge arrester being voidless and free of gaseous entrapments, said method comprising the steps of

(a) assembling said blocks as desired for forming said core;

(b) applying forces to said terminal blocks so as to compress together all of said blocks in said core;

(c) while maintaining said blocks under compression, enwrapping an array of said blocks with a winding comprising uncured plastic impregnated reinforcing material;

(d) curing said uncured plastic material under pressure so as to encase said blocks within said rigid shell free of voids and gaseous entrapments between said blocks and said shell; and

(e) providing a thusly formed core of encased blocks with said shedded outer housing fitting tightly onto said core and free of voids and gaseous entrapments between said shell and said outer housing.

5,159,749

WIRE TRANSFER DEVICE FOR LEAD MAKING MACHINE

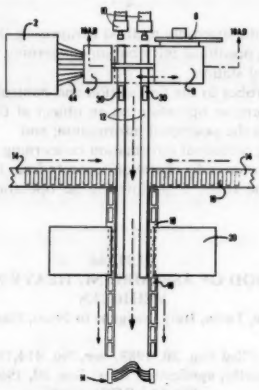
Fidelo Weigert, Durrwangen, and Matthias G. Reininger, Wort-/Ostalbkrs., both of Fed. Rep. of Germany, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 28, 1991, Ser. No. 646,979

Claims priority, application United Kingdom, Jan. 29, 1990, 9001999

Int. Cl.[5] H01R *73/04*

U.S. Cl. 29—742 **19 Claims**



1. A wire transfer station comprising:

an upper wire transfer track having wire shuttle means disposed thereon and moveable relative thereto;

a lower wire transfer track having wire shuttle means disposed thereon and moveable relative thereto;

a forward elevator mechanism which is moveable from the lower wire transfer track to the upper wire transfer track;

a rearward elevator mechanism which is moveable from the upper wire transfer track to the lower transfer track;

first pusher means adjacent to the forward elevator mechanism and the upper wire transfer track, for moving the wire shuttle means towards the rearward elevator member; and

second pusher means adjacent to the rearward elevator mechanism and the lower wire transfer track, for moving the wire shuttle means towards the forward elevator mechanism.

5,159,750

METHOD OF CONNECTING AN IC COMPONENT WITH ANOTHER ELECTRICAL COMPONENT

Vivek B. Dutta, Cupertino; Jeffrey C. Demmin, Mt. View; Mark L. Diorio, and Jon T. Ewanich, both of Cupertino, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Division of Ser. No. 454,802, Dec. 20, 1989, Pat. No. 5,008,734. This application Apr. 3, 1991, Ser. No. 679,705

Int. Cl.[5] H01R *43/00*

U.S. Cl. 29—827 **9 Claims**

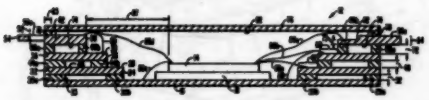
1. A method for providing sealed electrical connections

between an integrated circuit component having a plurality of contact pads and another electrical component, comprising:

providing a non-perforated base layer for supporting said integrated circuit component,

securing a first layer in a first position with respect to said base layer, said first layer having at least a first electrically conductive portion;

securing a second layer spaced from said first layer, said second layer having at least a first edge, said second layer having at least a first area which overlies and is spaced from said first layer, said second layer having at least a second electrically conductive portion;



electrically connecting one of said contact pads to at least one of said first electrically conductive portion and said second electrically conductive portion;

providing at least a first dielectric material between said first area and at least part of said first portion of said first layer wherein said first dielectric material is a gaseous material and;

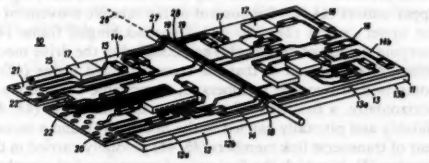
forming a seal for said integrated circuit and said electrical connections, said non-perforated base layer forming a part of said seal.

5,159,751

METHOD OF MANUFACTURING ELECTRONIC MODULE ASSEMBLY

David J. Cottingham, Palatine; Michael J. Petrites, Elk Grove Village, and Thomas J. Tischhauser, Hawthorn Woods, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 474,873, Feb. 5, 1990, Pat. No. 5,103,375.
This application Feb. 18, 1992, Ser. No. 835,817
Int. Cl.[5] H05K *3/30*
U.S. Cl. 29—832 **3 Claims**



1. A method for manufacturing an electronic module assembly comprising the steps of:

providing a rigid thermally conductive base having integral at least first and second portions each of which having a planar top surface and a bottom surface, said first and second base portion top surfaces being initially substantially coplanar;

providing first and second electrically conductive circuitry patterns, respectively, on different planar portions of a common integral insulating film, each of said different planar portions of said film provided on each of said first and second base portion top surfaces, respectively;

providing a plurality of discrete electrical components on and connected to each of said first and second circuitry patterns while said first and second base portions are substantially coplanar;

bending said base along at least one axis after providing said components on said circuitry patterns such that said first and second base portion top surfaces are non-coplanar and said bottom surfaces of said first and second base portions form the external surface of a protective housing for said components which are located in an interior space bounded by at least said first and second base portion top surfaces;

wherein said insulating film is also provided with conductive circuit paths thereon interconnecting said first and second circuitry patterns, and

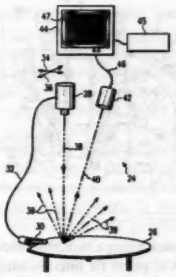
wherein said bending step includes providing a mandrel having an axis substantially coincident with the axis about which said base is bent during said bending step, and wherein said mandrel has a plurality of raised portions along its axis which mate with and contact corresponding portions of said base during said bending step through openings provided in said insulating film, said film having said interconnecting conductive circuit paths connecting said first and second circuitry patterns between said openings.

5,159,752

SCANNING ELECTRON MICROSCOPE BASED PARAMETRIC TESTING METHOD AND APPARATUS

Shivaling S. Mahant-Shetti, Richardson; Thomas J. Aton, Dallas, and Rebecca J. Gale, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 327,080, Mar. 22, 1989, Pat. No. 4,978,908.
This application Nov. 30, 1990, Ser. No. 595,920
The portion of the term of this patent subsequent to Dec. 18, 2007, has been disclaimed.
Int. Cl.[5] H05K *3/02*
U.S. Cl. 29—846 **12 Claims**



1. A method for evaluating and testing manufacturing processes on a semiconductor wafer, comprising the steps of:

providing a test structure having a first conductive region and a second conductive region;

biasing said first conductive region;

directing an irradiating beam at said second conductive region to free electrons from said test structure, wherein said free electrons represent the conductivity or isolation between said first and second conductive regions; and

detecting a portion of said free electrons to allow evaluation and testing of the processes.

5,159,753

ROLLER SHELF AND METHOD OF MAKING SAME

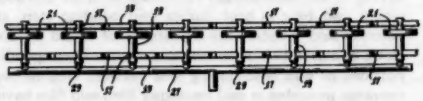
Arthur L. Torrence, Newtown, Conn., assignor to Mechtronics Corporation, Stamford, Conn.

Filed Feb. 21, 1991, Ser. No. 658,690
Int. Cl.[5] B65G *13/00*
U.S. Cl. 29—895.22 **6 Claims**

1. A method of making a roller self including the steps of:

molding a plurality of groups of parallel roller structures each said roller structure comprising an axle having at least one roller joined integrally therewith, each said group having a common runner interconnecting said parallel roller structures in that said group, said groups each having the same number of said roller structures;

providing a pair of side rails having opposed complementary beating recesses to receive said axles of said roller structures, the number of said bearing recesses being an integral multiple of the number of said roller structures in said groups,



simultaneously inserting said axles of said roller structures of a said group into said bearing recesses, and thereafter breaking off said runner,

whereby a roller bar is formed of each said pair of side rails and its inserted said roller structures.

5,159,754

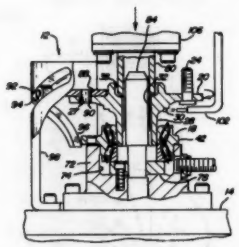
PROCESS FOR PRESS FITTING A VEHICLE WHEEL HUB INTO AN INTEGRAL BEARING

Frank J. Vancsik, Gross Pointe, Mich., assignor to The Budd Company, Troy, Mich.

Filed Mar. 20, 1991, Ser. No. 672,679

Int. Cl.[5] B23P *19/02*

U.S. Cl. 29—898.07 **4 Claims**



1. A process of assembling a motor vehicle wheel hub assembly in which a hub is press fit into an integral wheel bearing unit; said hub of the type having a precision formed external cylindrical surface which is pressed into said bearing unit and said bearing unit of the type having an outer race and an inner race with rolling elements therebetween and said inner race defining an inside cylindrical surface receiving said hub, said process comprising the steps of:

providing a press having a lower platen and an upper platen which are movable toward and away from one another;

supporting said bearing unit relative to one of said platen such that press forces can be transmitted to said inner race;

supporting said hub relative to the other of said platens;

locating said bearing unit and said hub relative to one another such that movement of said platens toward one another will cause said bearing and said hub to be pressed together;

actuating said press to force said platens together causing press loads to be transmitted through said hub, and through said bearing outer race, rolling elements and said inner race;

simultaneously with said actuating step, rotating said hub relative to said bearing outer race, causing said bearing rolling elements to move and progress relative to said bearing inner and outer races thereby causing said press loads transmitted through said bearing unit to be spread over progressing contact areas between said bearing rolling elements and inner and outer races as said bearing roller elements move and progress.

5,159,755

HINGED FRAMES FOR A DRY SHAVING APPARATUS

Albrecht Jestädt, Friedrichsdorf; Gerhard Schäfer, Frankfurt, and Jürgen Wolf, Kriftel, all of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

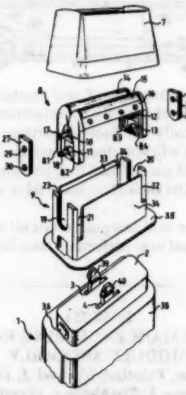
PCT No. PCT/DE90/00523, § 371 Date Nov. 22, 1991, § 102(e) Date Nov. 22, 1991, PCT Pub. No. WO90/14932, PCT Pub. Date Dec. 13, 1990

PCT Filed May 21, 1990, Ser. No. 776,368

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1989, 3917847

Int. Cl.[5] B26B *19/00, 19/02*

U.S. Cl. 30—43.92 **15 Claims**



1. A dry shaving apparatus comprising a drive mechanism arranged in a housing (1), a shaving head frame (7) mounted on the housing (1), a pair of shaving heads extending in longitudinal direction parallel with each other and including each an upper cutter (14, 15) and a lower cutter (42) and being movable vertically relative to and parallel with each other, a first hinged frame (8) mounted in the shaving head frame and carrying the upper cutters (14, 15) for control of the relative movement of the upper cutters (14, 15), and a second hinged frame (41) carrying the lower cutters (42) and coupled to the drive mechanism, characterized in that the second hinged frame (41) is comprised of two side members (5, 6) movable vertically and horizontally, a first pair of transverse link members (43, 44) slidably and pivotally carried in the housing (1), and a second pair of transverse link members (45, 46) pivotally carried in the housing (1), in which the first pair of transverse link members (43, 44) is coupled to the side members (5, 6) by means of pivot joints (48, 50, 80, 81) and the second pair of transverse link members (45, 46) is coupled to the side members (5, 6) by means of pivot and slide joints (62, 63, 66, 67).

5,159,756

METHOD OF AND APPARATUS FOR CUTTING A PIPE

Brian E. McGuire, Oldham, United Kingdom, assignor to British Gas plc, London, England

Filed Oct. 31, 1990, Ser. No. 606,920

Claims priority, application United Kingdom, Nov. 7, 1989, 8925104

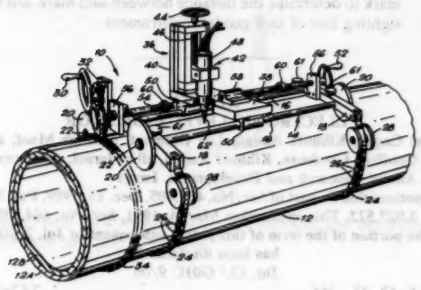
Int. Cl.[5] B23D *21/00*

U.S. Cl. 30—92 **4 Claims**

1. Apparatus for cutting a window in a pipe comprising:

a chassis having: guide means for extending longitudinally of the pipe; a cutter assembly comprising a cutter unit provided with a milling cutting tool, the cutter assembly being movably mounted on the guide means; control means for accurately controlling the positioning and

movement of the cutter assembly along the guide means; and means for accurately controlling the positioning and movement of the cutter unit in directions transverse to the directions of movement of the cutter assembly along the guide means and, in use, towards and away from the pipe, the cutting tool being capable of effecting cuts in the pipe wall in transverse directions;



attachment means adapted to embrace the pipe to attach the chassis to the pipe and to enable the chassis to be moved relative to the pipe in directions transverse to the directions of movement of the cutter assembly along the guide means and circumferentially of the pipe when the apparatus is in use; and

traction means associated with the chassis to facilitate accurately controlling the positioning and movement of the chassis relative to the pipe.

5,159,757

HAND SHEARS, PARTICULARLY BRANCH, HEDGE AND/OR GARDEN SHEARS

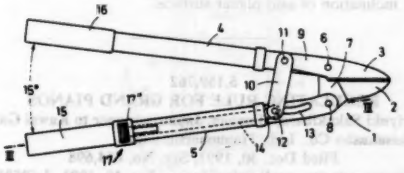
Helmut Weid, Niederdreisbach, and Peter Held, Scheuerfeld, both of Fed. Rep. of Germany, assignors to Wolf-Gerate G.m.b.H. Vertriebsgesellschaft KG, Betzdorf, Fed. Rep. of Germany

Continuation of Ser. No. 579,477, Sep. 10, 1990, abandoned. This application Jan. 21, 1992, Ser. No. 824,695

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1989, 3929891; May 10, 1990, 4015021

Int. Cl.[5] B26B *13/26*

U.S. Cl. 30—251 **14 Claims**



1. Hand shears, comprising first and second cutting elements pivotable about a first joint, first and second hand levers joined to one another directly independently of said cutting elements by means of a second joint offset parallel to said first joint, said first cutting element being connected rigidly with said first hand lever, said second cutting element having a driving arm extending beyond said first point, a coupler element hinged at one end to said driving arm and linked at a linking axis at its other end, so as to be freely movable with respect to said second hand lever, said first and second hand levers and said first and second cutting elements forming a four-joint system with one another in which at least the distance between the linking axis and said second joint is variable, means for fixing said linking axis (12) of the coupler element (10) at said second hand lever (5) at a plurality of positions differently spaced from said second joint (8) to effect variable power transmission, said means for fixing said linking axis being permanently attached to said second hand lever and being undetachable from said second hand lever, said means for fixing further comprising in said second hand lever (5) a slot guide (13) engaging said linking axis (12) of said coupler (10), and a slide (14) linked to said linking axis (12) for adjustably supporting said linking axis along said slot guide.

5,159,758

CARPET CUTTING TOOL

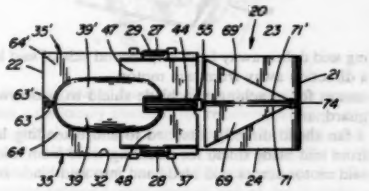
Lea H. MacDonald, 327 McEwen Drive, Kingston, Ontario, Canada K7M 3W2

Filed Sep. 30, 1991, Ser. No. 767,325

Claims priority, application Canada, Oct. 3, 1990, 2026790

Int. Cl.[5] B26B *29/00, 29/06, 29/02, 21/52*

U.S. Cl. 30—294 **13 Claims**



1. A carpet cutting tool comprising, in combination:

a) a base having the shape of a normally generally horizontal plate having a leading end, a trailing end and two opposed sides, an upper surface and an undersurface;

b) a pair of parallel, transversely spaced apart cutting blades, each blade having a normally lower end portion thereof secured to the base, a normally upper end portion defining a free tip portion of the blade projecting upwardly from said upper surface one near each of said sides, each blade having a cutting edge at a leading margin thereof, each cutting edge extending upward to the free tip portion of the respective blade a distance generally in excess of the thickness of a base layer of a carpet to be trimmed by the tool, but smaller than the overall thickness of the carpet, said cutting edges being parallel with each other and being transversely spaced apart a distance generally corresponding to the spacing of said blades;

c) a handle secured to the base and projecting upwardly therefrom, for selectively moving said base and thus the pair of blades in a longitudinal direction; and

d) workpiece clamp including a pair of workpiece clamping members secured to said base and operatively associated one with each of said cutting blades to hold a margin of a respective carpet sheet in engagement with the respective cutting blade;

whereby the margins of two carpet sheets placed freely side-by-side can be trimmed simultaneously, one by each of said blades by cutting through the entire thickness of the base layers of the respective carpets but not through the entire pile thereof.

5,159,759

DEBRIS SHIELD FOR A HAND HELD POWER SAW

Daniel L. Fringer, P.O. Box 171, Nolensville, Tenn. 37135

Filed Jun. 26, 1991, Ser. No. 721,170

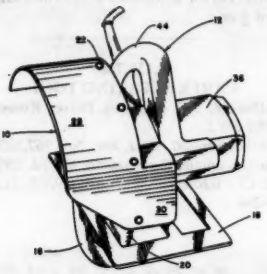
Int. Cl.[5] B23D *45/16*

U.S. Cl. 30—390 **5 Claims**

1. A device for protecting a user of a hand held power saw from flying debris, said power saw having an upper guard having a curvature, a blade which creates wind during rotation, a motor, and a fan, said blade having a first side proximate

said motor and a second side distally located from said motor said device comprising:

a. a blade shield shaped to conform to said upper guard curvature extending laterally away from said upper guard, said blade shield for shielding said user and receiving said wind created by said blade, and directing said received wind from said blade laterally along said shield and forcing said debris away from said second side of said blade in a direction away from said motor;



b. means for attaching said blade shield to said saw upper guard; and

c. a fan shield directly attached to and extending laterally from said blade shield for directing wind from said fan of said motor across said blade and into said blade shield.

5,159,760

DEVICE FOR ALIGNING A GEODETIC INSTRUMENT OVER A DEFINED POSITION MARK

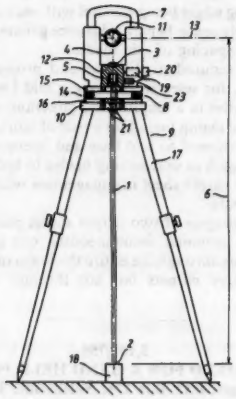
Armin Spiegel, Berneck, Switzerland, and Wolfgang Rebhandl, Dornbirn, Austria, assignors to Leica Heerbrugg AG, Heerbrugg, Switzerland

Filed Mar. 8, 1991, Ser. No. 665,795

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1990, 4007245

Int. Cl.[5] G01B *3/02*

U.S. Cl. 33—227 **7 Claims**



1. A device for centering a geodetic instrument over a defined mark which lies in the extension of the vertical axis of said instrument and for measuring the distance between said mark and the sighting line of said instrument comprising:

an optical sighting device arranged centrally with respect to said vertical axis of said instrument;

means for generating a visible, collimated laser beam and for projecting said beam onto said mark including

a light-emitting unit, disposed to be rotatable together with said instrument about said instrument vertical axis so that said mark lies in the extension of said vertical axis of said geodetic instrument; and,

a distance measuring device including means for modulating said beam and for analyzing the light reflected from said mark to determine the distance between said mark and the sighting line of said geodetic instrument.

5,159,761

ELECTRONIC LEVEL INDICATOR

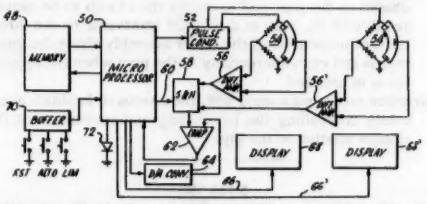
Uri Cagan, Kibbutz Amiad; Lev Diamant, Moshav Maof, and Geoffrey Goodman, Kibbutz Amiad, all of Israel, assignors to Amrad Research and Development, Israel

Continuation-in-part of Ser. No. 451,005, Dec. 15, 1989, Pat. No. 5,027,522. This application Mar. 4, 1991, Ser. No. 664,130

The portion of the term of this patent subsequent to Jul. 2, 2008, has been disclaimed.

Int. Cl.[5] G01C *9/06*

U.S. Cl. 33—366 **7 Claims**



1. An electronic level indicator, comprising:

a housing having at least one planar surface;

at least one gravity responsive sensor means mounted on said housing, each of said sensor means constituting at least a part of two branches of an electronic bridge circuit;

a pulse generator coupled to said bridge circuit for feeding said bridge circuit with short pulses;

a differential amplifier connected to the output of said bridge circuit;

an A/D convertor connected in circuit for receiving signals from said amplifier, and for receiving synchronization signals from said pulse generator, and

at least one display unit connected to the output of said converter for displaying numerical data indicative of the inclination of said planar surface.

5,159,762

REGULATING RULE FOR GRAND PIANOS

Noriyuki Sakakibara, Hamana, Japan, assignor to Kawai Gakki Seisakusho Co., Ltd., Hamamatsu, Japan

Filed Dec. 30, 1991, Ser. No. 814,698

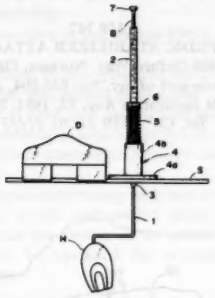
Claims priority, application Japan, Jan. 10, 1991, 3-69591

Int. Cl.[5] G10C *3/00*

U.S. Cl. 33—832 **4 Claims**

1. A regulating rule for grand pianos, comprising a mount adapted to be placed on wires extending in a tensed state, a measuring tube which is provided at the lower end thereof with a locking rod engaged with the lower surface of said mount, and which is adapted to be moved slidingly in the vertical direction through said mount, a substantially L-shaped measuring rod slidingly movable in the vertical direction through said measuring tube, and a pressure means urging said measuring tube so that the lower end of said measuring tube constantly contacts the lower surface of said mount, the quan-

tity of movement of a hammer being measured with said measuring rod placed on the upper end of said hammer with said



wires held between said measuring tube and said mount by the force of said pressure means.

5,159,763

DRYING ELEMENTS

Hans G. Platsch, Kupferstr. 40, D-W7000 Stuttgart 80, Fed. Rep. of Germany

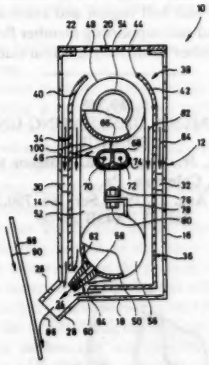
PCT No. PCT/EP89/00572, § 371 Date Feb. 28, 1991, § 102(e) Date Feb. 28, 1991, PCT Pub. No. WO90/03888, PCT Pub. Date Apr. 19, 1990

PCT Filed May 24, 1989, Ser. No. 655,442

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1988, 3835000

Int. Cl.[5] F26B *3/32*

U.S. Cl. 34—41 **12 Claims**



1. Drying element for use in a printer, with an electrical heating device through which blown air flows and with a blower duct which distributes the warm blown air transversely to the conveying direction of the printed products, characterized in that a rod-shaped infra-red radiator **(66)** extends parallel to the surface of a heating tube **(48)**, which is located upstream of the blower duct **(50, 60)** and has a surface absorbing infra-red radiation, said blower duct **(50, 60)** extending parallel to the heating tube **(48)** and being connected to the latter by way of a 180°-bend **(52)**.

5,159,764

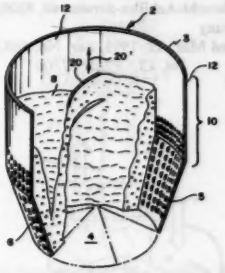
APPARATUS FOR CONDITIONING PARTICULATE MATERIAL

Jack Wireman, and Daniel R. Wireman, both of Fallbrook, Calif., assignors to Blaw Knox Food and Chemical Equipment Co., Inc., Buffalo, N.Y.

Filed Jul. 10, 1991, Ser. No. 727,933

Int. Cl.[5] F26B *17/00*

U.S. Cl. 34—57 E **10 Claims**



1. In an apparatus for conditioning particulate material comprising a stationary chamber for receiving a charge of particulate material, said stationary chamber having a wall with a generally circular cross-section and a generally upright axis and first and second locations therein, means for forming a controlled spinning quasi-packed bed of the material with an upper and a lower portion within said chamber and with relative movement with respect to said chamber, means for subjecting the controlled spinning bed to a conditioning step, and means for removing the conditioning material from said chamber, the improvement comprising movable mechanical separating means intersecting the upper portion of the controlled spinning bed for directing a portion of the particulate material from the upper portion of the spinning bed out of the spinning bed and in a direction away from said wall and means for positioning said mechanical separating means with respect to the spinning bed from the exterior of said chamber.

5,159,765

APPARATUS FOR FLUIDIZING AND TRANSFERRING POWDERED MATERIAL

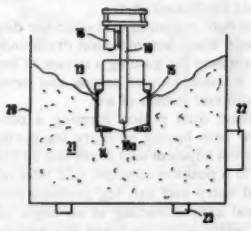
Erich Krämer, Michelau, Fed. Rep. of Germany, assignor to Metri Airfluid AG, Altstätten, Switzerland

Filed Apr. 18, 1991, Ser. No. 687,388

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1990, 4013061

Int. Cl.[5] F26B *17/00*

U.S. Cl. 34—57 R **18 Claims**



1. Apparatus for fluidizing powdered material within a container and transferring fluidized powder to a spray gun of an electrostatic powder coating plant; comprising:

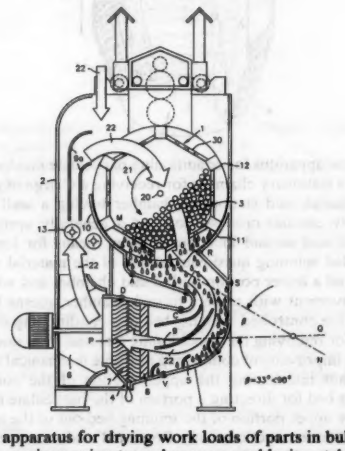
at least one suction and transport pipe immersible from above into the container and having a suction port;

fluidizing means for generating a locally limited powder fluid bed within the container;
screening means enclosing the immersing portion of said pipe and its suction port at a distance thereto; and
first vibrating means for causing oscillations of said screening means.

5,159,766
APPARATUS FOR DRYING GALVANIZED MASS-PRODUCED PARTS

Hans Henig, Albrecht-Achilles-Strasse 48, 8500, Nürnberg, Fed. Rep. of Germany

Filed Mar. 12, 1991, Ser. No. 669,068
Int. Cl.[5] F26B *21/06*
U.S. Cl. 34—77 **11 Claims**

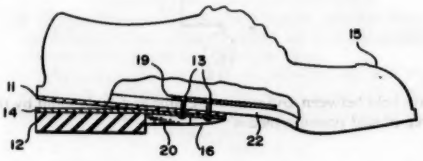


1. An apparatus for drying work loads of parts in bulk contained in an immersion-type drum removably insertable into the apparatus, said drum being in the shape of a longitudinal cylindrical perforated shell and rotatable around a horizontal longitudinal axis thereof comprising:
a container;
a drum in said container having a horizontal longitudinal axis and a perforated shell, and mounted for rotation about said longitudinal axis;
a drying chamber in said container for guiding a stream of air through said drum and a charge of work load parts therein;
blower means in said chamber having an inlet and an outlet;
an upstream region in said chamber disposed upstream of said drum, with respect to the direction of flow of said air, between said outlet of said blower means and said drum for guiding a stream of dry air to and into said drum through said perforated shell;
a downstream duct region in said chamber disposed downstream of said drum between said drum and said inlet of said blower means for guiding a stream of humid air from said drum to said blower means and removing liquid droplets from said stream of air;
said downstream duct region forming a substantially V-shaped flow path having an entry leg portion extending from a position adjacent said drum and an exit leg portion extending to a position adjacent said inlet of said blower means, said entry and exit leg portions having substantially central axes extending at an angle of $<90°$ with respect to each other, said exit leg portion axis being oriented substantially horizontally and said entry leg portion axis being inclined downwardly between said drum and the bottom of the V of said V-shaped flow path; and
curved plate members mounted in said container so that portions of said shell of said drum are in sliding and substantially sealing engagement therewith, said curved plate members partially enclosing said drum and being connected to said entry leg portion.

5,159,767
ORTHOPEDIC STABILIZER ATTACHMENT

Don T. Allen, 4406 Oxford Way, Norman, Okla. 73072

Continuation-in-part of Ser. No. 535,604, Jun. 11, 1990, abandoned. This application Aug. 12, 1991, Ser. No. 743,890
Int. Cl.[5] A43B *21/30, 21/32*
U.S. Cl. 36—27 **31 Claims**

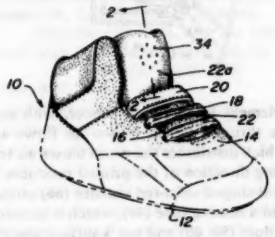


1. An orthopedic apparatus for use on a shoe having a sole portion, a region corresponding to the heel of a human foot, a region corresponding to the arch of a human foot, and a region corresponding to the ball of a human foot, comprising:
a substantially rigid mounting member adapted to mount a shoe heel and extending from the arch region backward toward the heel region;
a substantially flexible supporting member extending from the arch region backward toward the heel region;
a substantially rigid reinforcing member extending from the arch region forward to the ball region and reinforcing the sole portion of the shoe;
a fastener located in said arch region and fastening said mounting member, said supporting member and said reinforcing member to the sole portion of the shoe;
an acute angular separation being maintained between said supporting member and said mounting member, whereby said mounting member, said supporting member and said reinforcing member cooperate to distribute weight forward toward said ball region and rearward toward said heel region and said supporting member flexes toward said mounting member to thereby cushion said heel region.

5,159,768
SHOE WITH MUSIC GENERATING UNIT IN THE TONGUE

Anthony J. Longo, Jr., Pequea, Pa., assignor to Tiny-ettes Infant Shoes, Inc., Columbia, Pa.

Filed Aug. 27, 1991, Ser. No. 750,206
Int. Cl.[5] A43B *23/00*
U.S. Cl. 36—139 **1 Claim**



1. In a shoe for an infant's foot, the shoe having an instep, a throat along the instep, a tongue formed of flexible inner and outer panels hinged and attached only at one end to the instep

and extending along the entire length of the throat, said tongue being freely pivotable about said hinged end, and means extending across the thorat adjacent said hinged end of said tongue for releasably fastening the shoe to an infant's foot, the improvement comprising:

pocket means provided in said tongue above said hinged end thereof;

a pressure-activated, battery-powered music-generating unit disposed within said pocket means; and

means forming at least one aperture in said outer tongue panel for transmitting sounds emitted by said unit in response to pressure transmitted through said pocket means to said unit;

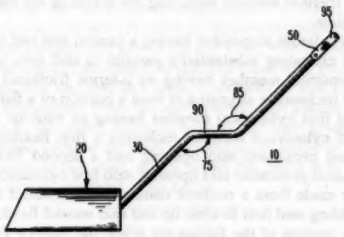
said hinged tongue cooperating with said releasable fastening means to enable said pocket means to be pivoted forwardly while the shoe is on an infant's foot to enable the pocket to be squeezed for activating the music-generated unit.

5,159,769

MATERIALS HANDLING DEVICE

Nicola Odorisio, 1973 W. Main St., Norristown, Pa. 19403

Filed Jan. 29, 1991, Ser. No. 647,292
Int. Cl.[5] E02H *5/02*
U.S. Cl. 37—278 **7 Claims**



1. A plow for manually removing material from a surface comprising:

a first member having a first concave surface oriented in a first direction;

a second concave member connected to the first concave member having a second concave surface oriented in a second direction, the second concave member and first concave member being connected at a single area to form a cutting surface;

a bracing member connected to the first and second concave members opposite the cutting surface;

a driving member connected to the bracing member for providing driving power to the plow and force which removes the material from the surface, wherein the driving member comprises a shaft bent at a first angle to facilitate a substantially maximum resultant force on the plow and to provide substantially optimal removal of the material from the surface and wherein the shaft is bent in a second angle to facilitate a substantially maximum resultant force on the plow and to further provide optimal removal of the material from the surface;

a substantially flat plate on an underside having edges connected to lower edges of the first and second concave members and the bracing member lower edge of for resting the plow on the surface and causing the plow to easily slide along the surface when removing material from the surface; and

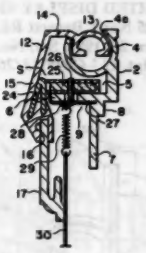
handle means coupled to the driving member for providing gripping power to the plow.

5,159,770

PARTING SURFACE STRUCTURE OF BULLETIN DEVICE

Kinichiro Yamaguchi, Tokyo, Japan, assignor to Artpanel Consultant Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 575,121, Aug. 30, 1990. This application Sep. 12, 1991, Ser. No. 758,700
Int. Cl.[5] A47G *1/06*; G09F *1/12*
U.S. Cl. 40—156 **4 Claims**



1. A parting surface structure of a bulletin device having a device frame, comprising:

a parting surface body which is formed as a front face of said device frame and is pivotable with respect to said device frame, said parting surface body including an inner peripheral edge having a fitting slot formed therein, and

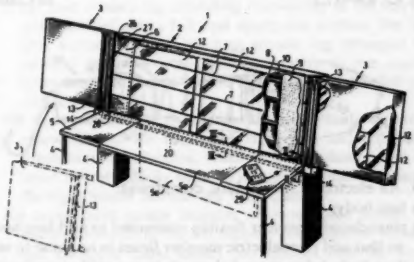
a second parting surface portion having a parting surface width and which removably fits in said fitting slot.

5,159,771

METHOD OF EXAMINING X-RAY FILMS AND THE LIKE AND AN EXAMINATION CABINET FOR SUCH FILM EXAMINATION

Carl-Eric Ohlson, Östermalmsgatan 7, Stockholm, Sweden S-114 24

PCT No. PCT/SE88/00430, § 371 Date Feb. 23, 1990, § 102(e) Date Feb. 23, 1990, PCT Pub. No. WO89/02096, PCT Pub. Date Mar. 9, 1989
PCT Filed Aug. 22, 1988, Ser. No. 465,113
Claims priority, application Sweden, Aug. 24, 1987, 8703276
Int. Cl.[5] G02B *27/02*
U.S. Cl. 40—361 **12 Claims**



6. An examination unit for X-ray films comprising:

a stand having a work table for a film examiner,

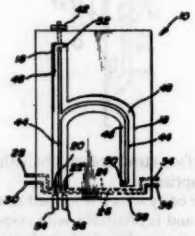
a cabinet equipped with a light source and having a mat glass surface illuminated by said light source,

a magazine attachable to the cabinet for receiving and supplying X-ray films to be examined, said magazine accommodating the X-ray films one against another and being attachable to one side of the cabinet, and

a transporting device for advancing individual X-ray films consecutively from the magazine to the illuminated mat

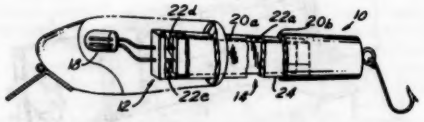
glass surface, the transporting device including a part which is horizontally movable, said part which is horizontally movable including means for releasably gripping the X-ray films by moving into and out of contact with opposite surfaces of the X-ray films only in a region near edge surfaces thereof and only when the X-ray films to be examined are located in front of the mat glass surface.

5,159,772
LIGHTED DISPLAY SIGNS
George E. Akaley, 225 North Burnett Rd., Cocoa, Fla. 32926
Filed Nov. 26, 1990, Ser. No. 617,643
Int. Cl.[5] G09F *13/26*
U.S. Cl. 40—545 7 Claims



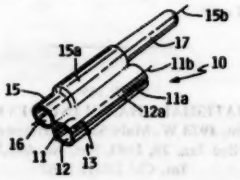
6. A lighted display device comprising a plurality of display devices each having a pari of male prongs extending from a first side of a display device and a pair of female receptacles extending from a second side of said display device, said male prongs and said female receptacles being connected to a pair of electrodes in a character forming channel filled with a neon gas, said male prongs connect in the female receptacles of an adjoining display device, and a reusable valve means repeatedly openable and closable extending to said channel for removing air and filling the channel with neon gases.

5,159,773
ELECTRIFIED FISHING LURE
Scott B. Gentry, 77221 Hipp Rd., Romeo, Mich. 48065; Joseph F. Mazur, 58471 Winston, Washington, Mich. 48094, and Brian K. Blackburn, 124 Glendale, Rochester, Mich. 48307
Filed Jan. 24, 1992, Ser. No. 825,039
Int. Cl.[5] A01K *85/01*
U.S. Cl. 43—17.1 10 Claims



8. An electrified fishing lure, comprising:
a lure body;
a piezoelectric member flexibly connected to said lure body so that said piezoelectric member flexes in response to said lure body being moved through water, said piezoelectric member comprising:
a piezoelectric film having a first side and an opposite second side;
a first electrode connected to said first side of said piezoelectric film;
a second electrode connected to said second side of said piezoelectric film, wherein flexing of said piezoelectric film results in an EMF between said first and second electrodes; and
flexible film means located adjacent at least one of said first and second sides for regulating the flexing of said piezoelectric film so as to optimize said EMF; and
illumination device means electrically connected with said pair of electrodes of said piezoelectric member for providing a predetermined illumination effect attractive to fish in response to said EMF.

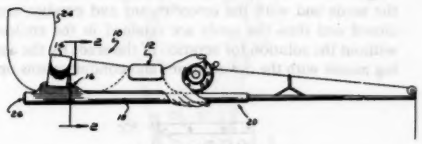
5,159,774
MARKER FOR FISHING RIG
Gary L. Bennis, Eau Claire, and Anthony M. Burlingame, Black River Falls, both of Wis., assignors to Gary Bennis, Eau Claire, Wis.
Filed Jan. 21, 1992, Ser. No. 822,748
Int. Cl.[5] A01K *75/02*
U.S. Cl. 43—17.5 10 Claims



1. A one piece device for temporary attachment to a fishing rig to enable a user to temporarily mount a chemiluminescence capsule thereon without impairing the action of the fishing rig comprising:
a first cylindrical member having a central axis and an opening extending substantially parallel to said axis, said first cylindrical member having an interior frictional surface for frictionally engaging at least a portion of a fishing rig, said first cylindrical member having an exterior surface, said cylindrical member including a first flexible lip located proximate said opening and a second flexible lip located proximate said opening, said first cylindrical member made from a resilient material, said resilient material holding said first flexible lip and said second flexible lip to the portion of the fishing rig when the interior frictional surface of the cylindrical member is located around the portion of a fishing rig, said first flexible lip and said second flexible lip flexible outward from said axis to allow removal of said first cylindrical member from the portion of the fishing rig, the resiliency of said first cylindrical member sufficient to hold the interior frictional surface in fixed position on the portion of the fishing rig during movement of the fishing rig so that the movement of the fishing rig causes said first cylindrical member to move in response to movement of the fishing rig;
an elongated cylindrical chemiluminescence capsule for providing illumination under low light conditions;
a second cylindrical member, said second cylindrical member connected to said first cylindrical member, said second cylindrical member having an exterior portion with said exterior portion of said second cylindrical portion secured to said exterior portion of said first cylindrical surface so that movement of said first cylindrical member is transferred to said second cylindrical member, said second cylindrical member formed of a resilient material and having an interior frictional surface for frictionally engaging and frictionally holding a portion of the chemiluminescence capsule therein to permit the chemiluminescence capsule to project outward from said second cylindrical member sufficiently far so as to permit a person to follow the movement of the fishing rig during darkness or low light conditions, said first cylindrical member, said second cylindrical member and said chemiluminescence capsule sufficiently lightweight in relation to said fishing rig so that the one piece device and chemiluminescence capsule do not impede the normal fishing motions of the fishing rig

so that a person fishing in darkness or low light conditions can readily detect the motion of the fishing rig by observing the motion of the illuminated chemiluminescence capsule mounted on the fishing rig.

5,159,775
SUPPORT HANDLE FOR A FISHING ROD
Daniel P. Sutula, Jr., 135 Debra La., Bristol, Conn. 06010
Filed Apr. 26, 1991, Ser. No. 691,860
Int. Cl.[5] A01K *97/10*
U.S. Cl. 43—21.2 **15 Claims**

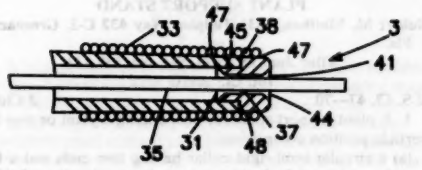


15. A support for a fishing rod comprising:

a. a rod shaft, wherein said rod shaft has a longitudinal axis; and

b. a forearm-and-wrist support means, fixedly attached to the shaft in stationary position relative thereto, for wrapping and straddling the majority of the circumference of a user's wrist and at least a portion of that user's forearm, wherein the forearm-and-wrist support is made of rigid plastic so as to always retain its shape and position relative to the longitudinal axis of the rod shaft, wherein the entire wrist support maintains its position relative to the longitudinal axis and acts as a passive restraint so that force can be transmitted from the rod, through the plastic support and to the user's forearm without the user grasping the rod and without the support changing its shape or position relative to the shaft, and wherein the user's arm remains parallel to the shaft at all times.

5,159,776
BREECH GUIDE
Dwayne Horton, 1922 Houstovia Dr., Knoxville, Tenn. 37918, and James C. Welborn, Jr., 707 Parkview Dr., Laurens, S.C. 29360
Filed Jul. 24, 1990, Ser. No. 557,553
Int. Cl.[5] A01K *87/04*
U.S. Cl. 43—24 **4 Claims**

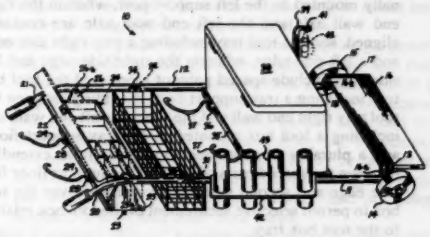


1. An eyelet, by means attached to a fishing rod tip where a fishing line passes through a rod shaft and exits through eyelet comprising:

a cylindrical, T-shaped housing with a smaller diameter neck and a larger diameter rim, said housing defining a cylindrical bore, an entrance port and an exit port, and said bore traversing said T-shaped housing in a vertical fashion and in communication with said entrance port and said exit port;

said neck being of a diameter smaller than that of said shaft so that said neck fits into said shaft thereby decreasing the diameter of said shaft.

5,159,777
FISHING CART APPARATUS
Oziel Gonzalez, 369 S. Dick Dowling, San Benito, Tex. 78586
Filed Dec. 2, 1991, Ser. No. 800,989
Int. Cl.[5] B62B *1/00*; A01K *97/00*
U.S. Cl. 43—54.1 **7 Claims**



1. A fishing cart apparatus, comprising,

a right support post in a spaced parallel coextensive relationship relative to a left support post, the right support post and left support post include a respective right post lower distal end and a left post lower distal end, with an axle integrally and orthogonally directed to the right support post and left support post adjacent the right post lower distal end and the left post lower distal end, and the axle rotatably mounting a right wheel and a left wheel mounted to respective right and left distal ends of the axle exteriorly of the right support post and left support post respectively, and

a work table pivotally mounted to the axle, the work table including securement means to secure the work table in a first position orthogonally oriented relative to the right support post and left support post, with the work table pivotal to a second position arranged in a parallel relationship relative to the right support post and left support post, and

the right wheel and the left wheel defined by a predetermined radius, and

the right post including a right post arcuate leg extending rearwardly of the right post defining an upper portion of the right post, and

a left post arcuate leg extending rearwardly of the left support post defining a left post upper end portion, the right post arcuate leg and left post arcuate leg arranged in a parallel coextensive relationship relative to one another extending rearwardly of the right post and the left post respectively, and

the right post arcuate leg and the left post arcuate leg extend rearwardly of the respective right post and left post a predetermined distance, wherein the predetermined distance is substantially equal to the predetermined radius of the right wheel and the left wheel, and

the securement means includes a lower cable mount rod fixedly mounted to the left support post adjacent the axle, and an upper cable mount rod spaced from the lower cable mount rod between the lower cable mount rod and the left post arcuate leg, and a support cable, the support cable fixedly mounted to the work table at a lower end of the support cable, and an upper end of the support cable selectively securable to the upper cable mount rod and the lower cable mount rod permitting displacement of the work table from the first position to the second position, and

a top cross brace integrally and orthogonally extending between the right post arcuate leg and the left post arcuate leg defining a rectilinear configuration defined by the

right support post, the left support post, the axle, and the top cross brace, and

a tool box tray pivotally mounted between the right support post and the left support post adjacent the top cross brace, wherein the tool box tray includes a tool tray right end wall and a left end wall orthogonally oriented relative to the right support post and the left support post respectively, wherein the tool tray right end wall includes a right end wall axle orthogonally directed through the tool tray right end wall and wherein the right end wall axle is orthogonally mounted to the right support post, and the tool tray left end wall including a left end wall axle pivotally directed through the tool tray left end wall orthogonally mounted to the left support post, wherein the right end wall axle and the left end wall axle are coaxially aligned, and the tool tray including a tray right side edge and a left side edge, wherein the right side edge and left side edge include spaced pairs of loops, and the tool box tray including a tray support floor extending between the tool tray right end wall and the tool tray left end wall, and including a tool box mounted to the tray support floor, and a plurality of elastomeric tool box straps extending between the spaced pairs of loops of the support floor first side edge and second side edge extending over the tool box to permit selective securement of the tool box relative to the tool box tray.

5,159,778

METHOD AND ARTICLE FOR THE PREVENTIVE PROTECTION OF MATERIALS AGAINST SOIL-DWELLING PESTS

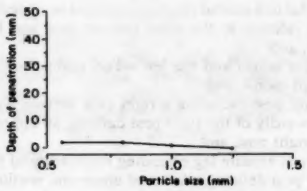
Wolfgang Metzner, Krefeld; Michael Pallaske, Kempen, and Hans-Werner Wegen, Krefeld, all of Fed. Rep. of Germany, assignors to Desowag Materialschutz GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Sep. 10, 1990, Ser. No. 579,966

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1989, 3931303

Int. Cl.[5] A01M *1/10*

U.S. Cl. 43—121 **21 Claims**



1. A method for the protection of an object against soil-dwelling pests, comprising arranging around the object at least one barrier comprised of a mixture of sharp-edged inert particles having a particle size screened from about 0.001 to 30 mm and spherical inert particles having a diameter of about 0.5 to 5.0 mm, wherein the sharp-edged and spherical inert particles are selected from the group consisting of glass splinters, ground glass, glass tinsel, glass spangles and glass beads.

5,159,779

SEED GERMINATING DEVICE AND METHOD OF USE

Jesse D. Johnson, 133 Lake View La., Brighton, Mich. 48116

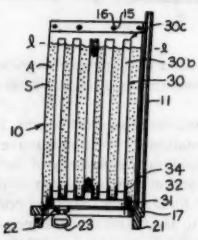
Division of Ser. No. 409,609, Sep. 18, 1989, Pat. No. 5,020,273. This application May 6, 1991, Ser. No. 696,170

Int. Cl.[5] A01B *79/00*

U.S. Cl. 47—61 **7 Claims**

2. A method for germinating seeds, which comprises:

(a) providing a container means defining an enclosure and having an upper end and a lower end and having an openable and closeable cover means at the upper end and an openable and closeable conduit means as a fluid outlet means at the lower end; and an aerating means within the enclosure for the seeds comprising vertically oriented perforated tubular means having opposed open ends providing an opening along a length of the tubular means between the opposed open ends with the length mounted between the upper end and the lower end of and in the enclosure of the container means on a base means in the enclosure, which provides a space adjacent to the conduit means, wherein the opening of the tubular means and the space of the base means are connected, wherein the tubular means has perforations between the opening and the enclosure of the container means; wherein in use of the device the seeds are germinated by providing the seeds in a solution in the enclosure of the container means with the length of the tubular means at least partially covered by the seeds and with the cover means and conduit means closed and then the seeds are retained in the enclosure without the solution for aeration of the seeds by the aerating means with the cover means and conduit means open;



(b) introducing seeds and an aqueous seed growing solution into the enclosure of the container means with the conduit means closed and the cover means open and then closing the cover means;

(c) soaking the seeds in the solution for a period of between about 1 and b **48** hours;

(d) removing the solution from the seeds through the fluid outlet means by opening the conduit means with the cover means open;

(e) allowing the seeds to aerate for a period of about 1 to 5 days with the cover means and the conduit means open so that air moves through the conduit means and through the space of the base means and into the tubular means to permeate the seeds before leaving the enclosure of the container means to remove heat from the seeds created by the germination of the seeds, to thereby provide the germinated seeds.

5,159,780

PLANT SUPPORT STAND

Robert M. Molthen, 3531 Tallpine Way 432 C-2, Greenacres, Fla.

Filed Jun. 13, 1990, Ser. No. 537,122

Int. Cl.[5] A01G *9/12*

U.S. Cl. 47—70 **3 Claims**

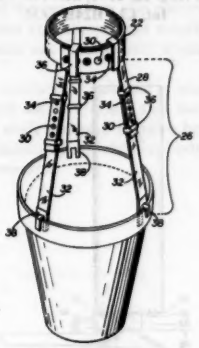
1. A plant support stand for maintaining a plant or tree in a verticle position comprising:

(a) a circular semi-rigid collar having two ends and a first detent means for locking said ends in a plurality of different overlapping positions;

(b) a plurality of elongated support members each having an upper and lower ends and being secured in supporting relationship to said collar at said upper end thereof and comprised of two pieces having lapping ends which may be separated and reattached via a second detent means to adjust said support stand to differing heights for accommodating plants or trees of differing sizes;

(c) each of said elongated support members being provided with an anchoring means at said lower end; and

(d) a plurality of slidable straps, at least one strap for said semi-rigid collar and at least one strap for each leg whereby the ends of said collar and the lapping ends of



each of said support members may be positioned by said detent members and then locked in place by said sliding straps.

5,159,781

WINDOW PANEL POSITION REGULATING ASSEMBLY

Donald L. Glossop, Jr., Dearborn Heights; Giuseppe Delena, Northville, and William J. Fobar, Wyandotte, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 4, 1990, Ser. No. 592,736

Int. Cl.[5] E05F *11/38*

U.S. Cl. 49—375 **10 Claims**

1. A vehicle door including an inner door panel and an outer door panel joined together in spaced relation to provide a door cavity therebetween and terminating at an upper edge thereof, said upper edge constituting an elongated beltline opening;

a window panel adapted to be raised and lowered within said door cavity and through said beltline opening, said window panel having an upper edge portion, lower edge portion, front edge portion, and rear edge portion, said front edge portion spaced apart from and opposite said rear edge portion and said upper edge portion spaced apart and opposite said lower edge portion thereby defining the extremities of the window panel, said window panel further having a midpoint portion located between said upper and lower edge portions;

guide means within said door cavity for guiding said window panel through said beltline opening as the window panel is raised and lowered.

said guide means including front and rear guide channel members secured to the vehicle door at said front and rear edge portions of the window panel, respectively;

lower guide follower means secured to said lower edge portion of said window panel and operatively associated with said guide means for establishing a fixed travel path for said lower edge portion of said window panel as the same passes through said beltline opening;

upper guide follower means secured to said window panel substantially above said lower edge portion and operatively associated with said guide means, said upper guide follower means including a pivot means;

said guide channel members circumscribing a generally singular arc whereby the window panel will be raised and lowered along a predetermined travel path;

at least one said guide channel members comprising a generally U-shaped channel member having a base and two oppositely disposed side flanges, each extending from a respective end of said base and including at a respective end thereof an inwardly directed flange, each said inwardly directed flange terminating at an end, the respective ends of said flanges being spaced from one another so as to define a vertically extending slot extending the vertical length of said guide channel member, said slot being disposed nearest said outer door panel;

said U-shaped channel member comprising a main guide channel section and a secondary guide channel section, said secondary guide channel section flaring outwardly at an obtuse angle at a throat section substantially opposite said beltline opening and being in open communication with said main channel section at such point, said secondary guide channel section constituting a ramp for laterally transferring the lower edge portion of said window panel about said pivot means, said ramp having an exterior side;

said upper guide follower means comprising a support member fixed at a midpoint portion of said window panel and extending through said slot within said U-shaped channel member, an upper slide member being pivotally attached to said support member and slidably received within said U-shaped channel member, said upper slide member constituting said pivot means and having a length sufficient to traverse said throat section;

said lower guide follower means comprising a lower support member extending through said slot within said U-shaped channel member, said support member including a first guide member at the free end thereof and received within said U-shaped channel member, and a second guide member disposed at the free end thereof and exteriorly of said U-shaped channel member whereby, as said window panel is elevated to a fully raised position, said second guide member will engage said exterior side of said ramp thereby causing said first guide member to be drawn into said ramp and translating said lower edge portion of said window panel laterally about said pivot means of said upper guide follower means to a position substantially flush with the outer door panel.

5,159,782

RETAINER FOR PRE-HUNG DOOR

Charles R. Sales, 4243 Springrock Cir., West Linn, Oreg. 97068

Filed Jan. 14, 1992, Ser. No. 820,340

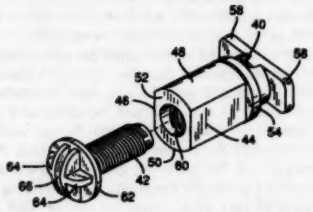
Int. Cl.[5] E06B *1/00*

U.S. Cl. 49—380 **9 Claims**

1. A retainer for a door and door jamb assembly wherein the door is pre-hung on the door jamb by hinges, and the door and a strike jamb of the door jamb are prepped for receiving a lockset whereby a cylindrical face bore extends through the door and a cylindrical edge bore extends from said face bore to a door edge and a bore is formed in said strike jamb of the door jamb, the retainer comprising;

a plug having a periphery that is partially cylindrical to form a cylindrical portion of said periphery and having a threaded center bore, and the cylindrical portion of said periphery dimensioned to closely fit the cylindrical edge

bore of said door, lobes extending transversely at one end of said plug and outwardly therefrom at opposed positions relative to the periphery of said plug and forming thereby a cross bar that is smaller in height and greater in width than the plug for limiting entry of said plug into the edge bore, and an opposite end of said plug extending beyond the edge of said door when said plug is inserted in said edge bore from said face bore, said opposite end engageable with the bore in the strike jamb to latch said door in a closed position relative to said door jamb, a threaded



fastener insertable through strike bore and threadably engageable with the threaded bore of said plug with the plug inserted in the edge bore of the door to thereby retain said plug and to secure said door in a closed position relative to said door jamb, and

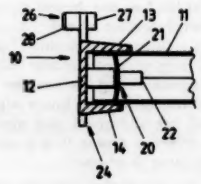
said plug configured with opposed flat sides extended from said opposite end of the plug and at least partially along the length thereof, said flat sides positioned on the periphery of said plug in alignment with the lobes and defining thereby a relieved crossway dimension of said plug to facilitate entry of the plug in the face bore of the door.

5,159,783

END CAP FOR LOUVRE

Anthony L. Rossiter, Greenfields, Australia, assignor to Vergola International Pty. Ltd., Greenfields, Australia

Filed Nov. 26, 1991, Ser. No. 797,989
Claims priority, application Australia, Nov. 28, 1990, PK3564
Int. Cl.[5] E06B *7/08*
U.S. Cl. 49—403 **10 Claims**



1. An end cap for fitment to a hollow sheet metal louvre comprising

an end wall which substantially extends across an end of a louvre,

a shaft on one side of the end wall, extending away from the louvre, for pivotal mounting of the end cap,

upper and lower flanges extending along the upper and lower edge of the end wall, and arranged, when the end cap is fitted to the louvre, to extend over the upper and lower surfaces of the louvre end, and

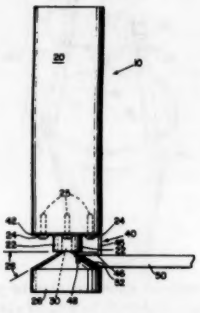
at least one resiliently deformable gripping member mounted between the upper and lower flanges which in use allows the end cap to be pushed onto the louvre, with the gripping member located interiorly thereof and being arranged to bear against the louvre sheet metal so as to hold the louvre between the gripping member and each upper and lower flange.

5,159,784

PORTABLE APPARATUS FOR SHARPENING BLADES

James E. Varner, Sr., 5125 Rivermont Dr., Jackson, Miss. 39212, and June W. DePriest, 217 Longwood Dr., Clinton, Miss. 39056

Filed Aug. 12, 1991, Ser. No. 743,834
Int. Cl.[5] B24B *3/36*
U.S. Cl. 51—173 **6 Claims**



1. A portable blade sharpener comprising:

(a) a rotating electric motor having an output shaft at one end thereof;

(b) a chuck operatively connected to said output shaft;

(c) a circular grinding stone having a drive shaft operatively connected to said chuck, said grinding stone having an angled portion facing said motor, said angled portion of said grinding stone tapering inwardly toward said drive shaft; and

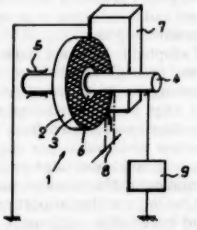
(d) a stationary guide bracket fixedly secured to said motor adjacent said grinding stone, said guide bracket having a spaced apart pair of guide fingers lying on opposite sides of said grinding stone, said guide fingers being positioned to seat against the edge of a blade being sharpened so as to position the blade for contact with the angled portion of said grinding stone while preventing contact of the blade with said drive shaft.

5,159,785

GRINDING OR CUTTING-OFF DISK FOR AN AUTOMATIC GRINDING MACHINE FOR CLEANING CASTINGS

Werner Lüber, Bahnhofstr. 23/32, 9602 Bazenheid, Switzerland

Filed Mar. 9, 1990, Ser. No. 491,077
Claims priority, application Switzerland, Mar. 29, 1989, 01130/89
Int. Cl.[5] B24D *7/02*
U.S. Cl. 51—206 R **2 Claims**



1. A grinding wheel for an automatic grinding machine for cleaning castings which castings are electrically connected to a first pole of a high-tension generator to form a first electrode

when received by the grinding machine during operation thereof, said grinding wheel comprising:

a disc-shaped abrasive body having parallel sides and provided with electrically conductive structural means for forming a second electrode electrically connected with a second pole of the generator, said electrically conductive structural means extending across substantially the entire extent of at least one parallel side of said abrasive body; and

an electrically conductive hub and a shaft, for rotatably supporting said abrasive body, said hub being disposed between said shaft and said abrasive body, said hub for electrically connecting said abrasive body with the second pole of the generator.

5,159,786

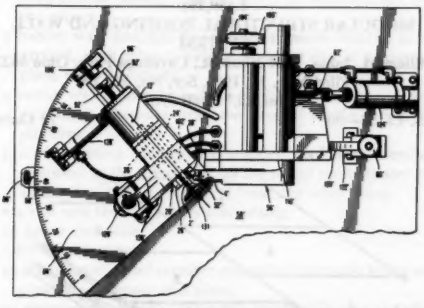
METHOD FOR REGRINDING A WORN VALVE

L. Carl Amundsen, Albany, Ga., assignor to Ran Can Corporation, Albany, Ga.

Division of Ser. No. 367,464, Jun. 16, 1989, Pat. No. 5,070,653. This application Jul. 30, 1991, Ser. No. 737,777

Int. Cl.[5] B24B *1/00*

U.S. Cl. 51—289 R **32 Claims**



1. A method for regrinding a worn valve from an internal combustion engine, the method comprising the steps of:

inserting the valve in a chuck of a centerless valve regrinder, said valve having a worn face, a tulip connected to said face, and a valve stem connected to said tulip, said stem having an axis, a distal end, a first notch worn into said stem at a location spaced from said tulip, and a second notch worn into said stem at a second location spaced from said distal end;

supporting said valve stem in said chuck on two elongated, fixed, parallel supports, said supports being of sufficient length to cradle and support said stem for a distance extending from a location adjacent said tulip to a location past said first notch;

powering a means for resurfacing said valve face;

simultaneously rotating said stem about said axis and drawing said valve face into contact with said means for resurfacing, said rotating and drawing steps being carried out by means of a drive wheel in said chuck angled with respect to said axis of said valve; and

regrinding said valve face until said valve face is substantially completely dressed.

5,159,787

METHOD FOR LAPPING TWO SURFACES OF A TITANIUM DISK

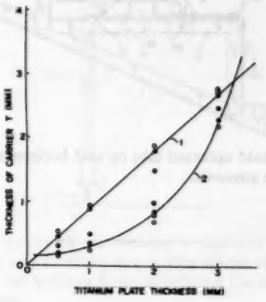
Hiroyoshi Suenaga; Takeshi Ito; Masakuni Takagi; Hiroyoshi Takeuchi; Hideaki Fukai, and Kuninori Minakawa, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 453,953, Dec. 20, 1989, abandoned. This application Sep. 30, 1991, Ser. No. 769,326

Claims priority, application Japan, Jan. 20, 1989, 1-9692

Int. Cl.[5] B24B *37/04*

U.S. Cl. 51—326 **11 Claims**



1. A method for lapping two surfaces of a titanium disk, comprising the steps of:

inserting loosely a titanium disk into an opening of a disk-type carrier, said carrier rotating and revolving between an upper surface plate and a lower surface plate which are held parallel to each other and which apply pressure to said titanium disk;

performing a first lapping step by feeding abrasives between said surface plates and said titanium disk;

etching chemically the titanium disk; and

performing a second lapping step by feeding a water solution containing colloidal Al_2O_3 between said surface plates and said titanium disk;

said titanium disk having a thickness t(mm) and said carrier having a thickness T(mm) such that $0.025 \exp(t+1.5) \leqq T \leqq 0.9\ t$.

5,159,788

CLOSED DECKING SYSTEM FOR STADIUM SEATING

Bruce C. Merrick, Goshen, Ky., assignor to Dant Corporation, Louisville, Ky.

Filed Jul. 2, 1991, Ser. No. 724,837

Int. Cl.[5] E04H *3/12*

U.S. Cl. 52—8 **8 Claims**

1. A decking system for bleacher-type stadium seating, comprising:

an understructure including a plurality of horizontally extending frame elements;

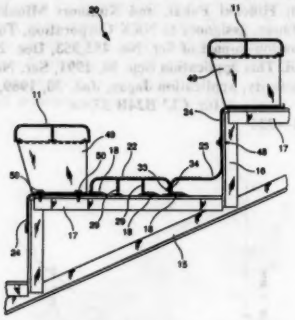
a plurality of extruded metal formed fillerboards, footboards, and riserboards adapted for mounting to the stadium seating understructure so as to define a series of rows of bleacher-type stadium seating, said footboards adapted to mount between said fillerboards and said riserboards; and

interlocking means for interlocking said fillerboards, footboards, riserboards and horizontally extending frame elements in a fixed relationship to each other, said interlocking means including

(a) said horizontally extending frame elements each having a plurality of upturned tabs,

(b) flange means on said riserboards for interlocking said fillerboards and said riserboards, and

(c) flange means on said fillerboards and said footboards for interlocking said fillerboards and said footboards



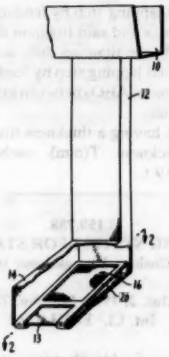
with said upturned tabs on said horizontally extending frame elements.

5,159,789

NOISE BAFFLE FOR DRAIN PIPES

Randy M. Haapanen, 9305 Lott Rd., Durham, Calif. 95938

Filed May 14, 1990, Ser. No. 523,019
Int. Cl.[5] E04D *13/08*
U.S. Cl. 52—16 21 Claims



1. A noise reduction device for a rain gutter system having a main horizontal gutter containing an opening therein, a downspout attached to said opening, said downspout having at least one vertical section and one angled section, said angled section having a bottom surface, and in which water is collected in the main gutter, flows through said opening into the vertical section, then falls through the vertical section onto the bottom surface of said angled section as it moves through said downspout, said device comprising:

means for baffling the noise caused by water falling through the vertical section of said downspout onto the surface of said angled section of said downspout;

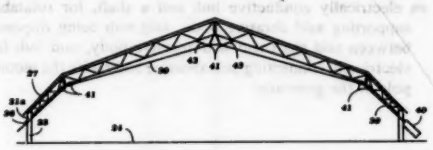
means for removably securing said noise baffling means to and spacing said noise baffling means above the angled section of said downspout in said rain gutter system, said noise baffling means being secured to and spaced above the angled section of the downspout.

5,159,790

FRAME STRUCTURE

Lewis R. Harding, 55 Waratah Avenue, Dalkeith, Australia

Continuation of Ser. No. 505,417, Apr. 6, 1990, abandoned. This application Feb. 4, 1992, Ser. No. 831,072
Claims priority, application Australia, Apr. 7, 1989, PJ3597
Int. Cl.[5] E04B *1/32*; E04C *3/10*
U.S. Cl. 52—86 13 Claims



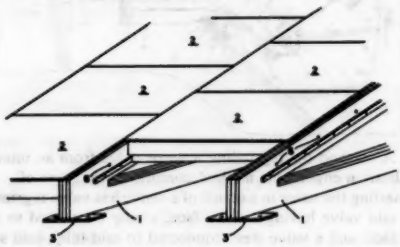
1. A frame structure having collapsed and erected conditions, comprising two rigid frame end sections and at least one rigid intermediate frame section aligned end to end in a generally horizontal relationship, with adjacent ends of said frame sections pivotably connected together, and at least one cable guideway mounted on each of said two end sections and on said intermediate frame section, wherein at least one of the cable guideways is spaced apart from the rigid frame sections, and each guideway which is spaced apart from the frame sections is supported on a bendable arm mounted on, and extending outwardly and downwardly of, the rigid frame sections and further, means for drawing the two end frame sections together thereby effecting relative pivotal movement between adjacent pivotably adjoined rigid frame sections and erecting the frame structure.

5,159,791

MODULAR STRUCTURAL ROOFING AND WALL SYSTEM

William M. Juhas, 2604 Ninth St., Cuyahoga Falls, Ohio 44221

Filed Mar. 13, 1989, Ser. No. 322,294
Int. Cl.[5] E04B *7/02*
U.S. Cl. 52—90 13 Claims



1. A roofing system, comprising:

a plurality of aligned support members in spaced apart relation to each other; and

a plurality of roof panels received between adjoining support members, each said roof panel comprising:

a top panel; and

a bottom panel spaced from and parallel to said top panel and overhanging said top panel along parallel sides thereof, said top and bottom panels being of the same length and longitudinally offset with respect to each other;

wherein said support members have panel support elements extending longitudinally therealong, said support elements receiving said roof panels, side support members extend down from opposite side edges of said top panel, said side support members being received and supported by said support elements, conduits extend between said

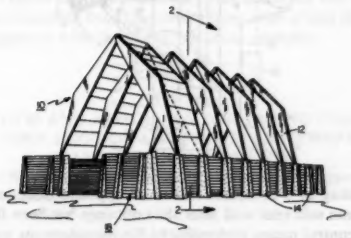
side support members of each said roof panel, fastening rods extend through said conduits and said support members, said fastening rods of each said roof panel making securing engagement with an adjoining roof panel, each of said fastening rod has a first end which is externally threaded, and a second end with is internally threaded, and roof panels between a first pair of support members are offset with respect to roof panels between pairs of support members on each side thereof.

5,159,792

ROOF TRUSS BUILDING

Patrick G. Pomento, 802 W. Embargo St., Rome, N.Y. 13440

Filed Mar. 11, 1991, Ser. No. 667,762
Int. Cl.[5] E04B *7/02*
U.S. Cl. 52—93 **10 Claims**



1. A building for housing particulate material which comprises:

a plurality of equally spaced pilasters secured in the ground, each pilaster having its upper end in a common plane with the others;

a barrier wall attached to adjacent pilasters secured in the ground, each pilaster having its upper end in a common plane with the others;

a barrier wall attached to adjacent pilasters, said barrier wall extending upwardly from the ground to the top of the pilasters;

a corresponding plurality of wooden roof truss members mounted, at the lower end, on the top of each pilaster and attached at their crown to at least one other truss;

each of said truss members comprising:

an upper end plate;

a lower end plate;

an inner linear chord member extending from said lower end plate to said upper end plate;

an outer chord member extending from said lower end plate to said upper end plate;

said outer chord member having aupper and lower chord sections each set at one end at diverging angle to said inner chord member and joined together at the other end to form a generally triangular shape;

a plurality of studs extending from said inner chord member to said upper and lower chord sections at spaced intervals therealong mounted perpendicular to said inner chord member;

a plurality of bridging members mounted between said studs at spaced intervals from and parallel to said inner chord member;

a plurality of plywood cover panels fastened to said chords, studs and bridging member on both sides thereof to enclose and stiffen said members to form an integral rigid beam truss member;

so that said pair of identical roof truss members form a roof frame structure awithout further bracing or truss members; and

cover sheeting meabns secured to the upper surface of the outer chord portions of the roof truss members to form a roof sheathing enclosing the building.

5,159,793

WALL SYSTEM

L. Scott Deugo, St-Lazare; Andrew Mansfield, Rigaud; Michael Salzman, Montreal; Bernhard von Huene, Pincourt, and Eberhard von Huene, Hudson, all of Canada, assignors to Krueger International Inc., Green Bay, Wis.

Filed Jun. 2, 1989, Ser. No. 360,861
Int. Cl.[5] E04D *15/00*; E04B *2/78*
U.S. Cl. 52—126.1 **60 Claims**

1. A wall system for partitioning a relatively large space having a floor and a ceiling into smaller spaces comprising:

a. means on the building floor for defining the outline of the wall system;

b. positioning means for defining the location of the top of the wall system fastened to the ceiling vertically above the outline defining means; and

c. a plurality of panels arranged in at least one vertical plane between the floor and the positioning means, each panel comprising:

i. a base assembly supported on the floor and comprising a horizontal pivot axis;

ii. a superstructure pivotally supported on the base assembly for pivoting about said horizontal axis into a vertical plane;

iii. covering means removably attached to the superstructure for creating a vertical partition; and

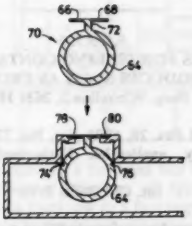
iv. vertically extendable and retractable means for releasably coupling the panel to the positioning means.

5,159,794

JAMB LINER SLOT COVER

John I. Habbersett, and Norman R. Westfall, both of Rochester, N.Y., assignors to Caldwell Manufacturing Company, Rochester, N.Y.

Filed Apr. 4, 1991, Ser. No. 680,569
Int. Cl.[5] E06B *1/04*
U.S. Cl. 52—207 **19 Claims**



11. In a tilt window having a sash guided between a pair of vertical jamb liners including spring systems housed within each of the jamb liners; sash shoes biased by the spring systems for upward movement within respective slots formed along sash runs of the liners; pins connecting each of the shoes to the

sash for counterbalancing weight of the sash with the spring systems; tracks formed on either side of the slots for guiding plow portions of the sash along the sash runs; and each track supported in part by a side wall on either side of the slots; the improvement wherein:

jamb liner slot covers are snap fit into exposed portions of the slots against outer portions of the side walls, forming respective stops for limiting upward movement of the shoes; and

each of said slot covers includes a tubular body and winged flanges that extend from a shoulder on said tubular body.

5,159,795

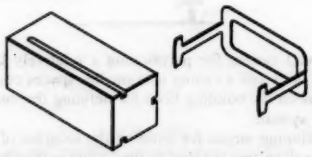
WALL CONSTRUCTION AND SPACER FOR USE THEREWITH

William J. Colen, 11248 Jamestown, Dallas, Tex. 75230

Continuation-in-part of Ser. No. 553,176, Jul. 13, 1990, Pat. No. 5,056,289. This application Oct. 11, 1991, Ser. No. 775,285

Int. Cl.[5] E04B *1/02*

U.S. Cl. 52—564 **7 Claims**



1. A wall, comprising:

a plurality of blocks arranged in at least first and second layers spaced one above the other by a predetermined distance, each of the blocks having an exterior face, an interior face, a top and a bottom, the top and bottom of each block having a longitudinal groove located a predetermined distance from the interior face and adapted to be aligned with the grooves of adjacent blocks, wherein the tops of adjacent blocks in each layer are located in a common plane;

a plurality of spacers each having a base supported against the interior faces of adjacent blocks in the first layer, each spacer having at least one arm extending transversely from the base in a plane perpendicular to the common plane, the arm having an upper edge supported against the bottom of a block in the second layer and a lower edge supported against the top of a block in the first layer, the arm including at its distal end upper and lower wedge-shaped tabs, the lower wedge-shaped tab extending downwardly into the longitudinal groove of a block in the first layer and the upper wedge-shaped tab extending upwardly into the longitudinal groove of a block in the second layer; and

a cementitious material located in the space between the first and second layers.

5,159,796

APPARATUS FOR FILLING CONTAINER WITH PRODUCTS SUCH AS FRUITS

Adrianus W. Tas, Burg. Winkellan 3, 2631 HG Nootdorp, Netherlands

Filed Jun. 28, 1991, Ser. No. 720,295

Claims priority, application Netherlands, Jul. 2, 1990, 9001501

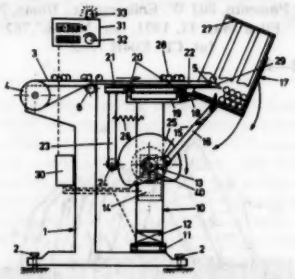
Int. Cl.[5] B65B *5/10*

U.S. Cl. 53—245 **12 Claims**

1. In an apparatus for uniformly filling a container having at least a front wall, a rear wall and a bottom wall with rollable products such as fruit to a predetermined weight or level of the product in the container, wherein a generally horizontal product supply means is disposed over the container for supplying and dropping the product into the container and the angle of the bottom wall with respect to the horizontal is decreased during filling in response to the instantaneous weight or level of the product in the container, the improvement comprising:

(1) a generally horizontal movable tongue disposed at least in part below and generally parallel to said supply means and at least in part over said front wall of said container and configured for receiving the rollable products from the supply means, rolling the products to an edge thereof and dropping the product into the container;

(2) moving means for generally horizontally moving the tongue in a single direction toward said rear wall during a



filling of a container and in an opposite direction away from said rear wall after the container has been filled;

(3) control means responsive to the instantaneous weight or level of product in the container for actuating the moving means and causing movement of the tongue to positions closer to said rear wall as the container is being filled and the angle of the bottom wall of the container with respect to the horizontal is decreased; and

wherein a height of drop of the products during filling thereof from the supply means by way of the tongue to the bottom wall or the filled product in the container is minimized and the container is uniformly filled.

5,159,797

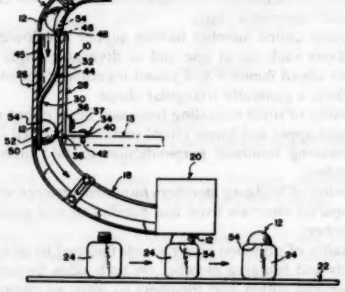
BALL CAP ORIENTER

Kenneth J. Herzog, 135 Industrial Blvd., Riverhead, N.Y. 11901

Filed Feb. 15, 1991, Ser. No. 655,741

Int. Cl.[5] B65B *7/28*

U.S. Cl. 53—312 **1 Claim**



1. A device for orientating ball caps with a flat end in a bottle type capping machine of the type having an upper cap chute assembly and a lower cap chute assembly, in combination with a capping stabilizer assembly and a conveyor carrying bottles to be capped, said device comprising:

a) a hollow cylindrical sleeve having an interior surface and a vertical longitudinal axis, said sleeve sized to fit verti-

cally between the upper cap chute assembly and the lower cap chute assembly to allow each ball cap to travel therethrough; and said sleeve having a top back edge and a bottom front edge;

b) means for securing said sleeve to the bottle type capping machine in its vertical position; and

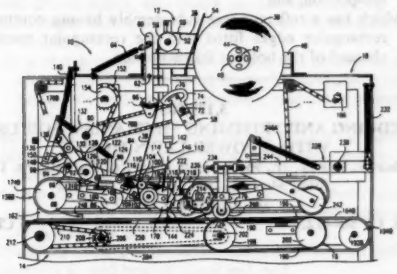
c) means for rotating each ball cap one hundred and eighty degrees when traveling through said sleeve by the force of gravity so that each ball cap will be in its proper position to be placed upon and capped to each bottle traveling along the conveyor below the capping stabilizer assembly, wherein said rotating means includes an elongated rod for contacting said flat end to guide each ball cap as each ball cap travels through said sleeve, said rod affixed to the interior surface of said sleeve in a one hundred and eighty degree twist with the upper end of said rod extending from the top back edge of said sleeve in alignment with the upper cap chute assembly and the lower end of said rod extending from the bottom front edge of said sleeve in alignment with the lower cap chute assembly.

5,159,798

METHOD AND APPARATUS FOR TAPING CLOSED THE OPEN EDGE OF AN ASSEMBLED NEWSPAPER HAVING LOOSE CONTENTS

Charles N. Hannon, Olathe, Kans., assignor to Stepper, Inc., Olathe, Kans.

Filed Aug. 29, 1991, Ser. No. 751,723
Int. Cl.[5] B65B *51/06*
U.S. Cl. 53—415 **30 Claims**



16. A method of taping closed the open edge of an assembled newspaper having loose contents, the newspaper having a leading folded edge and an opposed, trailing, open edge and having a first side and a second side, comprising the steps of:

advancing the newspaper in an upstream to downstream direction with the folded edge oriented in a downstream direction;

providing a tape having at least one adhesive-coated side and applying the said adhesive-coated side of a portion of said tape to the first side of the newspaper so that the remainder of said tape is unadhered to said first side of said newspaper;

providing a surface for receiving at least a portion of the remainder of said tape, said surface being located adjacent said second side of the newspaper;

temporarily adhering the adhesive-coated side of at least a part of the remainder of said tape to said surface;

advancing said surface in a downstream direction in adjacency to said second side of said newspaper; and

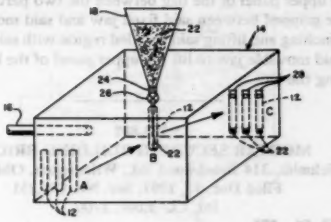
adhering said tape around said trailing open edge and to said second side of said newspaper by transferring the part of the remainder of the tape temporarily adhered to the surface to the second side of the newspaper during movement of the surface in a downstream direction.

5,159,799

VIAL WITH POWDERED REAGENT

Peter E. Rising, 132 Wilbur Pl., Bohemia, N.Y. 11716, and Peter G. Chaconas, 11607 Hitching Post La., Rockville, Md. 20852

Filed Oct. 24, 1991, Ser. No. 781,875
Int. Cl.[5] B65B *29/06, 31/02, 31/06, 51/20*
U.S. Cl. 53—433 **4 Claims**



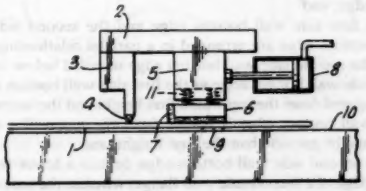
1. A method of making an indicator vial for detecting the presence of a predetermined contaminant in a liquid containing a mixture of powdered reagents which become reactive in the presence of said liquid to detect said contaminant comprising the steps of dehydrating said reagents and compounding them together in an inert atmosphere to form said mixture in a retention vessel, transferring a measured amount of said mixture to a tube in the presence of an inert gaseous medium at a pressure above atmospheric, capping said tube with means for producing a vacuum within said tube, heating an intermediate portion of said tube to permit a portion of said tube to partially collapse under said vacuum to form a narrow waist, pinching off said waist to seal the bottom portion of said tube containing said mixture forming said indicator vial, and removing the upper portion of said tube connected to said vacuum producing means leaving a vial containing an inert gas under a partial vacuum and a mixture of substantially anhydrous reagents which will react together in the presence of said liquid.

5,159,800

BAG OPENING DEVICE

Gian C. Gianelli, Milan, Italy, assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Continuation of Ser. No. 176,827, Apr. 4, 1988, Pat. No. 4,981,009. This application Aug. 28, 1990, Ser. No. 574,326
Claims priority, application United Kingdom, Sep. 22, 1987, 8722202
The portion of the term of this patent subsequent to Jan. 1, 2008, has been disclaimed.
Int. Cl.[5] B65B *43/26*
U.S. Cl. 53—492 **1 Claim**



1. A method of opening a flattened bag having upper and lower panels comprising the steps of: applying a first and higher pressure via a fixed jaw to a first region on one side of an upper panel of the bag and applying a second pressure lower than the first via a movable jaw to a second region on the same side of the upper panel of the bag, said movable jaw being transversely moveable towards and away from said fixed jaw and said fixed jaw being stationary with regard to transverse movement toward said movable jaw, said second region being

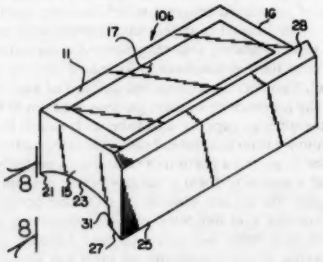
transversely spaced apart along the bag mouth from the first region, moving the movable jaw transversely along the bag mouth toward the fixed jaw for dragging only transversely the part of the bag where the lower pressure is applied towards the part where the higher pressure is applied via the fixed jaw, during said moving and dragging step, maintaining said first region stationary to said fixed jaw and maintaining said second region stationary to said movable jaw thereby causing a region of the upper panel of the bag between the two parts to buckle and be gripped between said fixed jaw and said movable jaw, and pinching and lifting said buckled region with said fixed jaw and said movable jaw to lift the upper panel of the bag, and so opening the bag.

5,159,801

MORTAR SECURING BUILDING BRICK

Karl Schmidt, 314 Beechwood Rd., Wilmington, Ohio 45177

Filed Dec. 13, 1991, Ser. No. 806,231
Int. Cl.[5] E04C *1/00*
U.S. Cl. 52—575 **2 Claims**



1. A building brick comprising,

a top wall spaced from a bottom wall, and

a first side wall spaced from and parallel a second side wall, and

a first end wall spaced from and parallel a second end wall, and

a bore directed orthogonally through the brick extending from the top wall through the bottom wall, the top wall including a top wall opening defined by a first width and a first length, and the bottom wall including a bottom wall opening defined by a second width and a second length, wherein the second width is greater than the first width and the second length greater than the first length, and

the bottom wall is arcuate and defines a concave cavity, wherein the first side wall includes a first side wall bottom edge spaced from and parallel a second side wall bottom edge, and

the first side wall bottom edge and the second side wall bottom edge are arranged in a parallel relationship, with the second side wall bottom edge oriented below the first side wall bottom edge as the first side wall bottom edge is spaced from the top wall a first height and the second side wall bottom edge is spaced from the top wall a second height greater than the first height, and

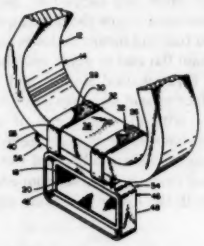
the second side wall bottom edge defines a lower terminal edge of a second side wall flange, wherein the second side wall flange includes a second side wall flange rear surface spaced from and parallel the first side wall, and the flange includes a canted planar surface canted rearwardly and upwardly relative to the second side wall towards the cancave cavity, and the top wall includes a canted top wall surface extending from the top wall downwardly relative to the second side wall, and the canted top wall surface is oriented parallel to the flange canted bottom planar surface.

5,159,802

REFLECTOR ASSEMBLY FOR REMOVABLE DEPENDING SECUREMENT TO EACH STIRRUP TO PROTECT A RIDER AND HORSE

Clayton R. Byrd, 43020 S.E. 134th Pl., North Bend, Wash. 98045

Filed Apr. 24, 1991, Ser. No. 690,680
Int. Cl.[5] B68C *3/00*
U.S. Cl. 54—46.1 **7 Claims**



1. A reflector assembly for securement to a stirrup to protect a rider and a horse;

which is removably secured to a stirrup to depend therefrom;

which has an elastomer integral holding and connecting subassembly: having portions thereof which temporarily are distorted enough to be interfitted with an English stirrup; having portions thereof which are a holding frame portion, inclusive of a rectangular receiving channel; and having an enlarged horizontal planar boot contacting sub-portion; and

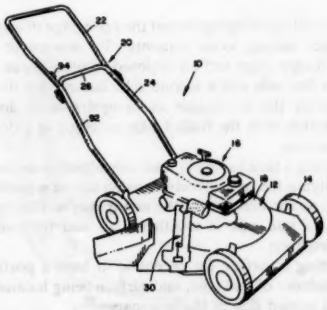
which has a reflector lens subassembly having continuous rectangular edges fitted into the rectangular receiving channel of the holding frame portion.

5,159,803

EDGING AND TRIMMING MECHANISM FOR USE WITH A POWER LAWN MOWER

Gilbert E. Earley, Jr., 96 Opossum Lake Rd., Carlisle, Pa. 17013

Filed May 31, 1991, Ser. No. 708,882
Int. Cl.[5] A01D *35/00*
U.S. Cl. 56—12.7 **4 Claims**



1. In combination with a power lawn mower having an internal combustion engine motor, a main housing, and a handle connected to the main housing, the improvement in combination therewith comprising:

edging and trimming means for edging and trimming grass, said edging and trimming means including

(1) a bracket having a proximal end, a distal end, a planar top surface and a bottom surface,

(2) a mounting base on said bracket proximal end, said

mounting base having a bottom edge connected to said bracket proximal end, a top edge spaced above said bracket top surface, and two side edges connecting said mounting base bottom edge to said mounting base top edge, said mounting bracket having a width dimension adjacent to said proximal end defined between said mounting base side edges and extending upwardly above said bracket top surface at a right angle to sad bracket top surface and having an elongate slot defined therethrough and extending widthwise of said bracket, a plurality of fastener receiving holes defined through said mounting base between said slot and each of said two side edges, a mounting projection on one of said two side edges adjacent to one of said fastener receiving holes,

(3) two wing-like connecting elements, each connecting one of said mounting base side edges to said bracket,

(4) a cable mounting element fixed to said mounting projection,

(5) a driven pulley mounted on said bracket distal end to rotate in a plane that is parallel to said bracket top surface,

(6) a drive shaft driving mechanism connected to the lawn mower motor to be driven thereby,

(7) a drive shaft connected to said drive shaft driving mechanism, said drive shaft being located adjacent to one side of the lawn mower,

(8) a driving pulley fixed to said drive shaft for rotation therewith,

(9) a drive belt wrapped around said driving pulley and around said driven pulley, said drive belt extending through said mounting base elongate slot,

(10) fasteners mounting said mounting base to the lawn mower main housing,

(11) a clutch mechanism for engaging said drive belt with said driving pulley and with said driven pulley for driving said driven pulley, said clutch mechanism including

(a) a clutch handle movably mounted on the lawn mower handle,

(b) a clutch cable connected at one end thereof to said clutch handle to be moved therewith, said clutch cable being mounted on said mounting base cable mounting bracket,

(c) a mounting shaft mounted on said bracket top surface,

(d) a bell crank pivotally mounted on said bracket top surface,

(e) a pulley connected to a second leg of said bell crank to move toward and away from said drive belt when said clutch handle is moved,

(12) a string housing mounted on said bracket bottom surface adjacent to said bracket distal end, and

(13) a string feeding and storing means connected to said driven pulley.

5,159,804

METHOD AND APPARATUS FOR TRANSFERRING A YARN TO A WINDING STATION OF A TEXTILE MACHINE

Norbert Schippers; Hans Raasch; Heinz-Dieter Göbbels, all of Mönchengladbach, and Maximilian Preutenborbeck, Aachen, all of Fed. Rep. of Germany, assignors to W. Schlafhorst AG & Co., Mönchengladbach, Fed. Rep. of Germany

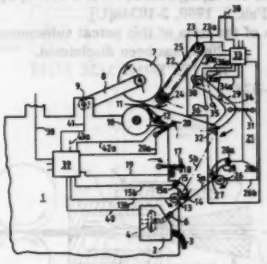
Filed Sep. 10, 1990, Ser. No. 580,328

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1989, 3930136

Int. Cl.[5] D01H *13/04, 9/10*

U.S. Cl. 57—261 **9 Claims**

1. Method for transferring a yarn after a yarn break to a normal yarn travel position at a textile machine winding station having a reciprocating yarn guide with a transverse motion, which comprises making a yarn connection between a yarn supply point and a takeup bobbin, providing an apparatus that re-establishes yarn travel with a yarn transfer device movably mounted thereon, subsequently transferring the yarn to the normal yarn travel position at a transfer point at the reciprocating yarn guide with a transfer motion of the yarn transfer device, monitoring the chronological course of the making of the yarn connection and the transverse motion of the yarn guide, and adapting the transfer motion of the yarn transfer device at the transfer point to the transverse motion of the yarn guide as a function of the time required by the machine for



making a yarn connection and of the time required by the machine during the transfer motion of the yarn transfer device and the time remaining before the arrival of the yarn guide at the transfer point for causing the yarn and the yarn guide to substantially simultaneously arrive at the transfer point of the yarn.

5,159,805

GUIDE ARRANGEMENT FOR PEG TRAYS ON A RING SPINNING MACHINE

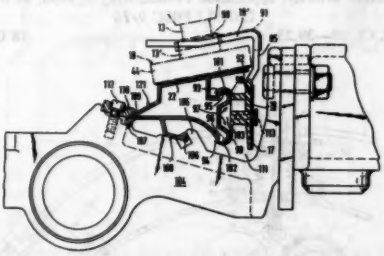
Jorg Wernli, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Apr. 3, 1991, Ser. No. 679,954

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1990, 4010730

Int. Cl.[5] D01H *9/10;* **B65H** *54/02*

U.S. Cl. 57—281 **20 Claims**



1. In a ring spinning machine, the combination comprising

a vertically disposed endless conveyor belt for moving along at least one row of spaced apart spinning stations;

a carrier rail extending along said row of spinning stations for slidably guiding peg trays thereon;

a guide rail secured to said carrier rail and having guide means on a vertical side thereof; and

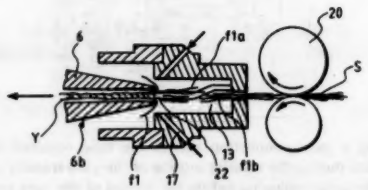
a plurality of connection pieces secured to said belt in spaced apart relation corresponding to the spaced relation of the spinning stations for moving the peg trays along said carrier rail, each said connection piece having a projecting finger for moving a respective peg tray along said carrier rail and guide means on a vertical side of said connecting piece in sliding engagement with said guide means on said guide rail.

5,159,806

APPARATUS FOR PRODUCING SPUN YARNS

Shigeki Mori, Ohtsu, and Kazuhiko Mikami, Kyoto, both of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Nov. 13, 1990, Ser. No. 612,410
Claims priority, application Japan, Nov. 14, 1989, 1-295594; Feb. 5, 1990, 2-10342[U]; Feb. 5, 1990, 2-10343[U]; Feb. 5, 1990, 2-10344[U]; Feb. 5, 1990, 2-10346[U]
The portion of the term of this patent subsequent to Sep. 15, 2009, has been disclaimed.
Int. Cl.[5] D01H *5/28, 1/115*
U.S. Cl. 57—328 22 Claims



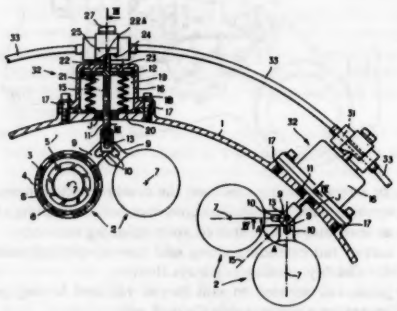
1. An apparatus for producing yarn comprising:
drafting means for drafting a fiber bundle, the fiber bundle defining an inner portion,
twisting means for twisting the drafted fiber bundle to produce a yarn, and
guide means for guiding the fiber bundle, the guide means having a portion thereof disposed within the inner portion of the fiber bundle being supplied from the drafting means to the twisting means.

5,159,807

CONTROL SYSTEM FOR OXIDIZER INTAKE DIAPHRAGMS

Alexandre Forestier, Melun, France, assignor to Societe Nationale d'Etude et de Construction de Motors d'Aviation "S.N.E.C.M.A.", Paris, France

Filed May 1, 1991, Ser. No. 694,256
Claims priority, application France, May 3, 1990, 90 05556
Int. Cl.[5] F02C *9/16*
U.S. Cl. 60—39.23 18 Claims



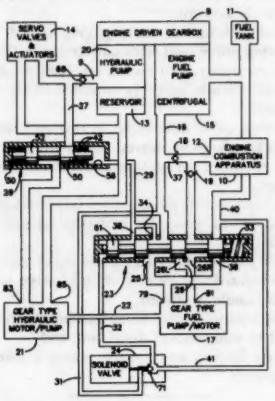
1. A system for controlling oxidizer intake diaphragms for a gas turbine combustion chamber wherein the gas turbine has at least two intake diaphragms comprising:
a) a first collar member operatively associated with a first intake diaphragm and adapted to move about a first axis;
b) a second collar member operatively associated with a second intake diaphragm and adapted to move about a second axis;
c) a regulator having a single control member; and,
d) means for connecting the control member with both the first and second collar members such that operation of the regulator controls movement of the first and second collar members wherein the connecting means comprises:
i) a first control arm extending from the first collar member;
ii) a second control arm extending from the second collar member; and,
iii) pivot attachment means pivotally attaching the first and second control arms to the control member;
and wherein the control member has a longitudinal axis and is oriented such that the longitudinal axis bisects an angle between a first line extending between the first axis and the pivot attachment means, and a second line between the second axis and the pivot attachment means.

5,159,808

GAS TURBINE ENGINE FUEL AND HYDRAULIC FLUID PUMPING SYSTEM

Howard B. Kast, Fairfield, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Jul. 9, 1990, Ser. No. 550,340
Int. Cl.[5] F02C *7/236*
U.S. Cl. 60—39.091 5 Claims



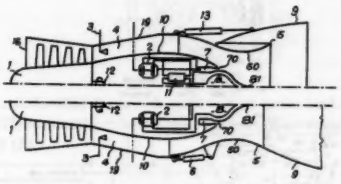
1. A gas turbine engine fuel and hydraulic fluid pumping apparatus comprising:
a fuel circuit and a hydraulic fluid circuit isolated from said fuel circuit.
a first means for pressurizing the fuel in said fuel circuit and a first means for pressurizing the hydraulic fluid in said hydraulic fluid circuit.
a second means for pressurizing the fuel in said fuel circuit and a second means for pressurizing the hydraulic fluid in said hydraulic fluid circuit.
wherein said second means for pressurizing the fuel and hydraulic fluid in their respective circuits include fuel and hydraulic fluid reversible pump-motors in their respective circuits, means for switching said pump-motors to their pump or motor modes, and means to drive one of said pump-motors in its pump mode by other of said pump-motors in its motor mode.
wherein said means for switching said pump-motors to their pump and motor modes includes a hydraulic slide valve interposed in said hydraulic fluid circuit between said first and second means for pressurizing the hydraulic fluid.

5,159,809

HIGHLY ADAPTABLE COMBINED PROPULSION ENGINE FOR AN AIRCRAFT OR A SPACE-GOING AIRPLANE

Jean-Pierre Clais, Blanquefort, and Eric Hermant, Vernon, both of France, assignors to Societe Europeenne de Propulsion, Suresnes, France

Filed Dec. 19, 1990, Ser. No. 630,088
Claims priority, application France, Dec. 21, 1989, 89 17007
Int. Cl.[5] F02K 9/00
U.S. Cl. 60—225 **30 Claims**



1. A highly adaptable combined propulsion engine for an aircraft or a space-going airplane, the engine comprising a jet engine for operating in air-breathing manner in the atmosphere and a rocket engine having liquid or gaseous propellants for operating in non-air-breathing manner in space, the jet engine comprising an air inlet device and an external nozzle which, in association with a central body having a longitudinal axis, defines an air-breathing combustion chamber having an air-breathing stream of combustion gases passing therethrough, and the rocket engine comprising a non-air-breathing annular combustion chamber and at least one turbo pump for feeding the annular combustion chamber with propellant, wherein the annular combustion chamber of the rocket engine is disposed inside the central body of the jet engine, is situated in the portion downstream from the air-breathing combustion chamber in the rear portion of the central body, and is itself delimitated by a streamlined central body portion extending the central body of the air-breathing combustion chamber to constitute a spike which penetrates into the throat of the external nozzle while ensuring aerodynamic continuity of the stream of combustion gases from the air-breathing combustion chamber, and wherein means are provided for modifying the axial position of the external nozzle of the jet engine in order to adapt the flow section for the stream of combustion gases from the air-breathing combustion chamber through the throat of said nozzle to different internal and external operating conditions of the engine, the air-breathing jet engine and the non-air-breathing rocket engine being capable of operating alternately or simultaneously in combined operation, in different stages of flight.

5,159,810

CATALYTIC CONVERTER MONITORING USING DOWNSTREAM OXYGEN SENSOR

Peter J. Grutter, Livonia; Gerald G. Stock, Whitmore Lake; John A. Cushing, Taylor, and Alexander Y. Gopp, Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 26, 1991, Ser. No. 750,173
Int. Cl.[5] F01N 2/20
U.S. Cl. 60—274 **11 Claims**

1. An apparatus for monitoring catalytic converter efficiency in an internal combustion engine including

an exhaust path for an engine;

an upstream exhaust gas oxygen sensor (EGO);

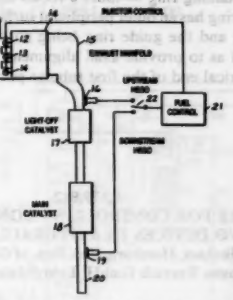
a catalytic converter in the exhaust stream;

a downstream exhaust gas oxygen sensor;

switching means coupled to both said upstream exhaust gas oxygen sensor and said downstream exhaust gas oxygen sensor;

fuel control means coupled to said switch means for causing the switch means to switch between said upstream and downstream exhaust gas oxygen sensor;

fuel injectors coupled to said fuel control means and responsive to said control means for injecting a determined amount of fuel; and



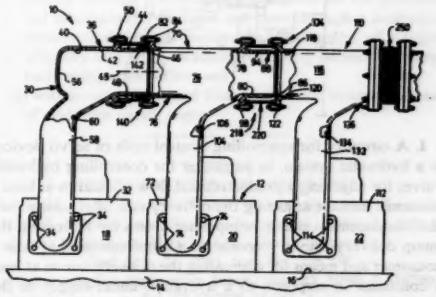
said fuel control means adapted to switch to said upstream exhaust gas oxygen sensor during normal air/fuel ratio control and switch to said downstream exhaust gas oxygen sensor during air/fuel control when catalytic converter efficiencies being monitored.

5,159,811

FLEXIBLE COUPLING DEVICE FOR USE IN AN ENGINE MANIFOLD SYSTEM

Gregory W. Hefler, Dunlap, and Michael J. Evancik, Chillicothe, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Jul. 16, 1990, Ser. No. 552,976
Int. Cl.[5] F01N 7/00
U.S. Cl. 60—322 **19 Claims**



1. A flexible coupling device for sealingly connecting first and second tubular bodies, the first tubular body including a first tubular portion having a central axis, a cylindrical end defining a first tubular portion end face, and a radially outwardly extending flange axially spaced from the first tubular portion end face, the second tubular body including a second tubular portion having a planar mounting surface substantially concentric with the central axis; the flexible coupling device comprising:

a guide ring having a radially outwardly extending flange and disposed in telescopic relation with the cylindrical end of the first tubular portion;

a flexible bellows having a first attachment end and a second attachment end;

first retaining ring means including a first retaining ring for releasably securing the first attachment end of the flexible

bellows between the first retaining ring and the flange of the first tubular portion; and

second retaining ring means including a second retaining ring for releasably securing the second attachment end of the flexible bellows and the guide ring to the planar mounting surface of the second tubular member, the second retaining ring includes a recess and the flange of the guide ring has an outer peripheral surface pressfitted in the recess, and the guide ring being so constructed and arranged as to provide axial alignment and support of the cylindrical end of the first tubular portion.

5,159,812

CIRCUITRY FOR CONTROLLING CONTROL COILS OF SERVO DEVICES IN A HYDRAULIC SYSTEM

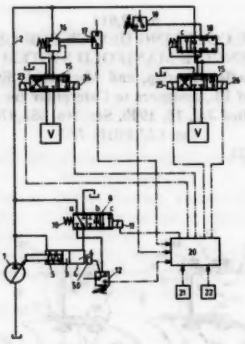
Heinrich Nikolaus, Hamburg, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

Filed Dec. 21, 1990, Ser. No. 633,084

Claims priority, application Fed. Rep. of Germany, Dec. 29, 1989, 3943357

Int. Cl.[5] F15B *11/16*; F04B *1/08*; H01F *7/18*

U.S. Cl. 60—445 **9 Claims**



1. A circuitry for controlling control coils of servo devices in a hydraulic system, in particular for controlling hydraulic valves for adjusting a predetermined flow of fluid to at least a consumer and for adjusting the delivery rate of at least a variable displacement pump, comprising means for increasing the pump delivery rate in response to a requirement of at least a consumer and means for decreasing the delivery rate to at least a consumer in response to a hydraulic under-supply in the hydraulic system, characterized in that a first electrical limit signal is generated in response to an unsufficient capacity of the pump which signal is delivered to an electronic control circuit for controlling the control coil of at least a servo device to decrease the flow delivery rate to at least a consumer; and wherein the generation of said first electrical limit signal is solely and exclusively based upon the physical event of said variable displacement pump attaining its maximum delivery rate; wherein a second electrical limit signal is generated in response to an unsufficient flow rate to at least a consumer which second signal is delivered to said electronic control circuit for controlling the control coil of a further servo means to increase the pump delivery rate; and wherein the generation of said second electrical limit signal is solely and exclusively based upon the physical event of a valve associated with a consumer attaining a predetermined specific position.

5,159,813

SLEWING CONTROL DEVICE FOR CRANE

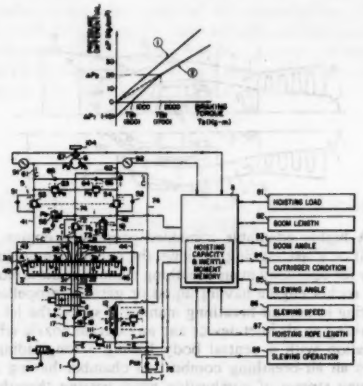
Hideaki Yoshimatsu, Akashi, and Koichi Fukushima, Kobe, both of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Dec. 5, 1990, Ser. No. 622,777

Claims priority, application Japan, Apr. 25, 1990, 2-111246

Int. Cl.[5] F16D *31/02*

U.S. Cl. 60—459 **3 Claims**



1. In a hydraulic slewing crane adapted to supply a discharge oil from a hydraulic pump through a slewing control valve to a slewing motor and control a rotational direction and a rotational speed of said slewing motor, a slewing control device for said crane comprising:

a brake pressure control valve for variably controlling a discharge pressure of said slewing motor;

an acceleration pressure control valve for variably controlling a suction pressure of said slewing motor; and

control means for outputting to both said pressure control valves a pressure control signal to be determined according to an operational condition of said crane upon braking of a slewing body and controlling both said discharge pressure and said suction pressure of said slewing motor to control a pressure differential therebetween such that the pressure differential has a negative minimum value.

5,159,814

PNEUMATIC IMPULSE MOTOR WITH GAS CUSHION

Gunnar S. Jakobsson, Kalmar, Sweden, assignor to Berema Aktiebolag, Solna, Sweden

Filed Oct. 26, 1990, Ser. No. 604,763

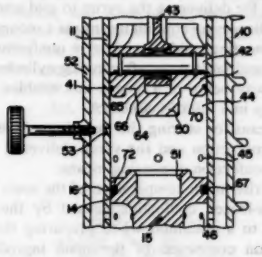
Claims priority, application Sweden, Oct. 28, 1989, 8903622

Int. Cl.[5] F15B *7/02*; F01L *17/00*

U.S. Cl. 60—542 **7 Claims**

1. An impulse motor for a hammer machine comprising a housing **(10)** with a cylinder **(11)** therein, in which a reciprocating drive piston **(40)** via a gas cushion in a working chamber **(44)** of said cylinder **(11)** repeatedly drives a hammer piston **(15)** to impact on and to return from a tool **(20)** carried by the machine housing **(10)**, and wherein one of said drive piston **(40)** and hammer piston **(15)** elements has an axially protruding reduced diameter damping piston **(50)** thereon adapted to prevent piston encounter collision by arresting the return movement of said hammer piston **(15)** towards the drive piston **(40)** in a cooperating damping cylinder **(51)** provided on the other piston, characterized in that said damping piston **(50)** has at least two diametrical steps **(64, 65)** formed thereon, of which an outer step **(64)** has a clearance relative to said damping cylinder **(51)** enabling during arresting an initial braking action therebetween by gas friction in said clearance, and an inner-

most diametrical step (65) at the root of said damping piston (50) receivable in said damping cylinder (51) in substantially



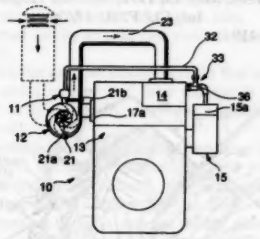
sealing relationship therewith sufficient to brake said hammer piston (15) resiliently to halt due to gas trapped in said damping cylinder (51).

5,159,815

TURBOCHARGED INTERNAL COMBUSTION ENGINE

Hans J. Schlamadinger, Columbus, Ind., assignor to Cummins Engine Company, Columbus, Ind.

Filed Jul. 15, 1991, Ser. No. 730,218
Int. Cl.[5] F02B *37/12*; F02D *23/02*
U.S. Cl. 60—603 **7 Claims**



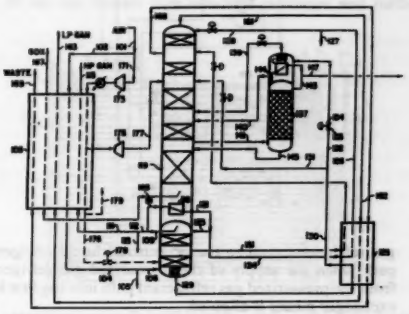
1. An internal combustion engine comprising an exhaust gas turbocharger having a turbine section provided with a housing having an interior primary passageway and a secondary passageway, and a turbine wheel within said housing and responsive to the exhaust gas flow through said primary passageway, said secondary passageway effecting bypassing of a predetermined amount of exhaust gas away from said turbine wheel when the engine is in a selected operating mode, and a compressor section having a compressor wheel operatively connected to said turbine wheel and mounted within a housing and in communication with an engine air intake manifold; a pressure responsive adjustable fuel feed means in communication with engine combustion chambers; a pressure responsive wastegate means having an adjustable valve for regulating the exhaust gas flow through the secondary passageway, said valve being biased to a closed position with respect to said secondary passageway; and a multiport connection having an interior cavity with a first port in pressure communication with said wastegate means whereby the pressure within such cavity is in opposition to the valve bias, a second port in pressure communication with said air intake manifold, and a third port in pressure communication with said fuel feed means; when pressure within the cavity is below a predetermined amount, the bias on said adjustable valve overcomes said cavity pressure and effects adjustment of said valve to said closed position, the fuel feed means is directly responsive to the cavity pressure and reduces fuel feed to said engine combustion chambers.

5,159,816

METHOD OF PURIFYING ARGON THROUGH CRYOGENIC ADSORPTION

Kenneth W. Kovak, Macungie; Rakesh Agrawal, and Janice C. Peterson, both of Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 14, 1991, Ser. No. 700,022
Int. Cl.[5] F25J *3/04, 3/00*
U.S. Cl. 62—22 **5 Claims**



1. A process for the production of high purity argon comprising:

(a) recovering an argon-enriched sidestream from a cryogenic air separation distillation system;

(b) passing said argon-enriched sidestream into an argon sidearm column and withdrawing therefrom a crude argon stream containing less than about 0.8 mole% oxygen and less than 0.5 mol% nitrogen;

(c) passing said crude argon stream into a final purification system comprising a cryogenic adsorption system for the removal of nitrogen and the removal of oxygen by physical adsorption by first passing the crude argon stream at a rate to provide a space velocity of 0.25 to 0.25 feet per second through a molecular sieve suited for the preferential adsorption of nitrogen and then through a molecular sieve suited for the preferential adsorption of oxygen whereby said physical adsorption being performed essentially refrigeration free; and

(d) withdrawing from said final purification system a stream of said high purity argon.

5,159,817

REFRIGERANT PATH APPARATUS

Toshiyuki Hojo, Shimizu; Kenji Tokusa, Shizuoka; Kensaku Oguni, Shimizu, and Susumu Nakayama, Shizuoka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

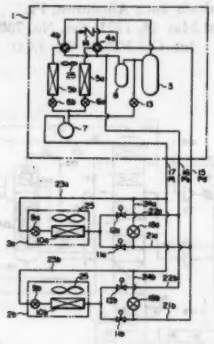
Filed Nov. 21, 1991, Ser. No. 795,737
Claims priority, application Japan, Nov. 21, 1990, 2-316760
Int. Cl.[5] F25B *13/00*
U.S. Cl. 62—81 **20 Claims**

17. A method for controlling a refrigerant path apparatus including a pressurized gas refrigerant path for a flow of a pressurized gas refrigerant which has not been substantially cooled to be liquefied, a pressurized liquid refrigerant path for a flow of a pressurized liquid refrigerant which is generated from the pressurized gas refrigerant by being cooled to be liquefied, a first heat exchanger means which is fluidly connected to the pressurized gas refrigerant path to supply the pressurized gas refrigerant into the first heat exchanger so that a heat exchange is carried out between the pressurized gas refrigerant in the first heat exchanger and the outside of the first heat exchanger, comprising the steps of

allowing a flow of the refrigerant from the pressurized gas refrigerant path to the pressurized liquid refrigerant path when a supply of the pressurized gas refrigerant from the

pressurized gas refrigerant path into the first heat exchanger means is prevented, and

preventing the flow of the refrigerant from the pressurized



gas refrigerant path to the pressurized liquid refrigerant path when the supply of the pressurized gas refrigerant from the pressurized gas refrigerant path into the first heat exchanger means is allowed.

5,159,818

APPARATUS FOR PREPARING A SEMI-FROZEN CONFECTION

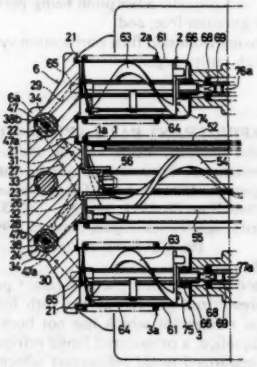
Ryoukichi Etou; Kinji Hashizume; Mitsuo Ikeda, all of Ibaraki, and Hideo Asada, c/o Nissei Refrigeration Ltd. 8-10, 4-chome Sawaraginishi, Ibaraki-shi, Osaka-fu, Japan 567 , assignors to Hideo Asada, Osaka, Japan

Filed Mar. 4, 1991, Ser. No. 664,220

Claims priority, application Japan, Aug. 10, 1990, 2-212625; Aug. 10, 1990, 2-212626; Aug. 10, 1990, 2-212627; Feb. 6, 1991, 3-15457

Int. Cl.[5] A23G *9/00*

U.S. Cl. 62—137 **23 Claims**



2. An apparatus for preparing a semi-frozen confection comprising:

at least one semi-frozen confection dispensing conduit means provided with a semi-frozen confection dispensing outlet;

a freezing cylinder for a main ingredient of the semi-frozen confection connected to said semi-frozen confection dispensing conduit means, where raw materials of the main ingredient are stirred and refrigerated to produce the main ingredient;

at least one syrup refrigerating cylinder mounted in the vicinity of both said semi-frozen confection dispensing conduit means and said freezing cylinder, capable of cooling the syrup below about 0° C. while being stirred;

syrup delivering means attached to said syrup refrigerating cylinder for delivering the syrup to said semi-frozen confection dispensing conduit means via a second passageway for connecting said semi-frozen confection dispensing conduit and said syrup refrigerating cylinder, said second passageway being of a length that enables delivering of the syrup in a viscous condition;

stirring means for stirring the main ingredient of the semi-frozen confection and the syrup delivered to said semi-frozen confection dispensing means;

wherein a rise in the temperature of the main ingredient of the semi-frozen confection caused by the syrup is restrained to a minimum when preparing the semi-frozen confection composed of the main ingredient and the syrup.

5,159,819

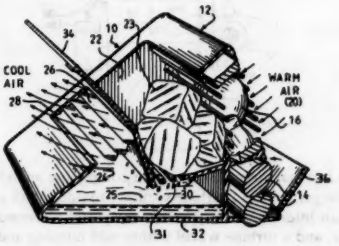
PALM SIZED AIR CONDITIONER

Charles Y. H. Wong, 95-262 Waioleka St., #26, Mililani, Hi. 96789

Filed May 13, 1991, Ser. No. 713,956

Int. Cl.[5] F25D *17/06*

U.S. Cl. 62—419 **7 Claims**



1. A palm sized air conditioner for the introduction of cooled air for personal comfort, comprising:

(a) a housing having a front with an ingress point and a rear with an egress point, and an inclined floor;

(b) batteries disposed within said housing;

(c) an ice chamber disposed within said housing and containing ice fragments with crevices and cracks;

(d) a box fan moving air at room temperature through said ice chamber to produce cool air; and

(e) vertically adjustable horizontal vanes for receiving said cool air, said box fan passing said cool air up and out of said vent, said vertically adjustable horizontal vanes for receiving said cool air being always at the same elevation as and colinear with said box fan for moving said air at room temperature so that air flow through said minute cracks and said crevices that naturally occur whenever said separate ice fragments of random size and shapre are clustered together and thus allowing the use of any available ice, said inclined floor causes said ice fragments to continually slide down and settle at said vent which places said ice directly in the path of said airflow at all times and constantly produces a cooling effect so long as any particles of said ice remain.

5,159,820
OIL SEPARATOR INTEGRALLY MOUNTED ON COMPRESSOR

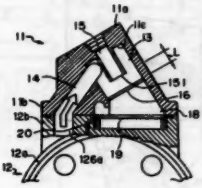
Shigeji Ohishi, Kariya; Shin Honda, Nagoya; Hisayoshi Sakakibara, Nishio, and Kenichi Fujiwara, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 5, 1990, Ser. No. 548,703

Claims priority, application Japan, Jul. 5, 1989, 2-173562; May 9, 1990, 1-117508

Int. Cl.[5] F25B *43/02*

U.S. Cl. 62—468 **29 Claims**



1. An oil separator used in a refrigerating system comprising an arrangement in series of a compressor, a condenser, an expanding means, and an evaporator, said compressor outputting a mixed fluid of a refrigerating medium and lubricating oil, said oil separator receiving said mixed fluid, separating said lubricating oil from said mixed fluid, and returning said lubricating oil to said compressor, said oil separator comprising:

first circumferential wall means for forming a cylindrical bore therein, to thereby form an oil separating chamber, said oil separating chamber having an axis;

first and second axially spaced end walls closing said cylindrical bore;

means for forming an inlet passage in said first circumferential wall means so that said inlet passage is tangentially connected to said cylindrical bore at a position near said first end wall;

means for forming a medium outlet passage therein to extend coaxially with said axis from said first end wall into said cylindrical bore, said medium outlet passage having an inner opening facing said second end wall;

means for forming at least one oil outlet passage at said second end wall at a position near a periphery of said second end wall; and

second circumferential wall means for forming an oil storage chamber therein for storing oil separated in said oil separating chamber and fed through said oil outlet passage;

wherein said compressor comprises a compressor housing, and said first circumferential wall means and said second circumferential wall means are formed integrally with said compressor housing, said compressor housing having an intake passage and a discharge passage, said discharge passage having a discharge end opening, said inlet passage in said first circumferential wall means having an inlet end opening, said first circumferential wall means being integrally mounted on said compressor housing so that said discharge end opening of said discharge passage meets said inlet end opening of said inlet passage, an axis of said oil separator being one of parallel and inclined to an axis of said compressor when said oil separator is affixed to said compressor.

5,159,821
RECEIVER TANK

Miki Nakamura, Konan, Japan, assignor to Zexel Corporation, Tokyo, Japan

Filed Aug. 5, 1991, Ser. No. 740,618

Claims priority, application Japan, Aug. 23, 1990, 2-222024

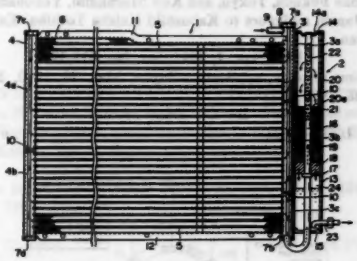
Int. Cl.[5] F25B *39/04*

U.S. Cl. 62—509 **11 Claims**

1. A liquid refrigerant receiver tank for use with a refrigerant condenser, the condenser having a pair of spaced opposed vertical header pipes interconnected in fluid communication by a plurality of horizontal tubes, and a fin disposed between each adjacent pair of tubes, the condenser receiving a gaseous refrigerant and passing it therethrough and condensing it into a liquid and finally collecting the condensed liquid refrigerant in a lower part of one of the header pipes, said receiver tank comprising:

a substantially tubular container disposed vertically along and beside the outside of the one header pipe;

a liquid refrigerant guide pipe extending from the lower part of the one header pipe into said container and further



extending upwardly within said container along the length thereof, said guide pipe including an upper portion disposed within said container and having a number of perforations, said guide pipe conducting liquid refrigerant from one header pipe into said container and introducing it into the interior of said container through said perforations; and

a liquid refrigerant outlet pipe connected at one end thereof with a lower end portion of said container for discharging the liquid refrigerant from said lower end portion of said container.

5,159,822
THREADING AND YARN-CHANGING DEVICE FOR YARN GUIDES

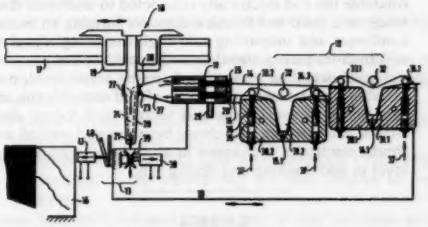
Franz Schmid, Bodelshausen, and Fritz Walker, Kusterdingen, both of Fed. Rep. of Germany, assignors to H. Stoll GmbH & Co., Fed. Rep. of Germany

Filed Mar. 11, 1991, Ser. No. 667,228

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1990, 4008058

Int. Cl.[5] D04B *15/56*; D03D *47/34*

U.S. Cl. 66—126 R **6 Claims**



1. A threading and yarn-changing device for movable yarn guides of flat knitting machines, comprising:

yarn guides, said yarn guides having at least one yarn guide channel with a yarn entry orifice and a yarn exit orifice; a yarn blowing-nozzle head with a plurality of yarn inlet channels, said nozzle head having a blowing-nozzle upstream of said yarn entry orifice and alignable with said yarn entry orifice of at least one of said yarn guides; a

yarn-proportioning part preceding said nozzle head such that yarn is fed from the yarn-proportioning part to the nozzle head, said yarn-proportioning part having a yarn-loop region with a yarn looper, front and rear separately actuable yarn-clamps, the yarn looper being located between said yarn-clamps, and at least one yarn-clamping and cutting-off device for said yarn guides of the flat knitting machine, being positionable downstream from the said yarn exit orifice.

5,159,823

WASHING MACHINE

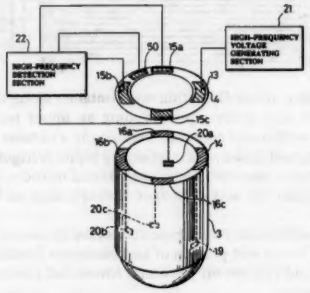
Norisuke Fukuda, Tokyo, and Koji Murakami, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 1, 1991, Ser. No. 677,392

Claims priority, application Japan, Mar. 30, 1990, 2-84717; Apr. 28, 1990, 2-114397

Int. Cl.[5] D06F *33/02*

U.S. Cl. 68—12.21 **6 Claims**



1. A washing machine, comprising:

a fixed outer tub;

a rotatable washing and drying tub disposed within said fixed outer tub;

a first electrode provided at an upper portion of said outer tub and electrically connected to a high-frequency signal source;

a second electrode provided at an upper portion of said rotatable tub and electrically connected to said first electrode, said first and second electrodes forming an input condenser and receiving a high-frequency signal from said high-frequency signal source;

a third electrode provided at said upper portion of said outer tub and electrically connected to a high-frequency signal detecting circuit;

a fourth electrode provided at said upper portion of said rotatable tub and electrically connected to said third electrode, said third and fourth electrodes forming an output condenser and outputting said high-frequency signal to said high-frequency signal detecting circuit; and

water-level detecting means for detecting water level, provided at a predetermined position of said rotatable tub and electrically connected to said second and fourth electrodes, such that an impedance between said second and fourth electrodes is changed in accordance with a water level in said washing and drying tub.

5,159,824

APPARATUS FOR HIGH VELOCITY DYE DRAINAGE

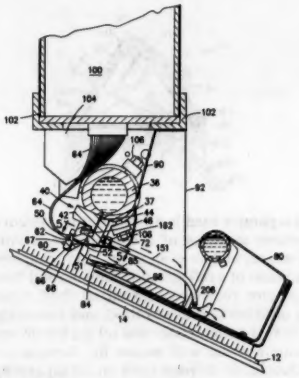
William H. Stewart, Jr., Campobello, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed May 13, 1991, Ser. No. 699,158

Int. Cl.[5] D06B *1/02*

U.S. Cl. 68—205 R **26 Claims**

1. An apparatus for applying liquids to a moving substrate comprising means for conveying the substrate in a predetermined path of travel, liquid applicator means having a row of outlets extending across and positioned above the substrate path for discharging a corresponding row of generally parallel, undeflected primary streams of liquid or a trajectory directed toward the substrate path, a source of electrically encoded pattern data, gas passage means positioned adjacent to said row of outlets and aligned with the discharge axes of the outlets for selectively deflecting, in accordance with pattern data from such data source, the trajectory of said primary streams of liquid emerging from said outlets with streams of gas from said



gas passage means which intersect said primary streams of liquid, a liquid collection chamber positioned adjacent to said outlets and opposite from said gas passage means, said liquid collection chamber having an opening which extends along said row of outlets and which is positioned to receive said gas streams and primary liquid streams deflected by said gas streams and thereby prevent said streams from contacting said substrate, and a plurality of first liquid conduits operatively attached to said liquid applicator means and directed into said collection chamber.

5,159,825

DEDIMPLING APPARATUS

Richard L. Shafer, and Allen E. Mackall, both of Negley, Ohio, assignors to Buckeye Manufacturing Company, East Palestine, Ohio

Division of Ser. No. 514,662, Apr. 25, 1990, Pat. No. 5,103,663. This application Jun. 14, 1991, Ser. No. 715,690

Int. Cl.[5] B21D *31/00*

U.S. Cl. 72—111 **6 Claims**

1. Apparatus for removing dimples from the wall of tubes at a cut end thereof, comprising:

tube transfer means for sequentially moving tubes to and from a dedimpler station;

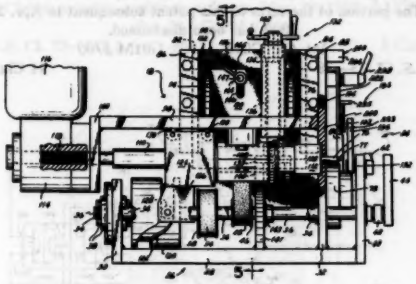
a presser roller located at said dedimpler station in a position to contact the outer surface of the tube wall at the cut end of the tube;

a dedimpler plug located at said dedimpler station, said dedimpler plug being movable between an extended position in which one end of said dedimpler plug extends into the cut end of the tube and contacts the inner surface of the tube wall thereat, and a retracted position in which said dedimpler plug is removed from the end of the tube, said dedimpler plug being effective in said extended position to press the tube wall at the cut end of the tube against said presser roller to substantially remove dimples thereat;

drive means including a rotating drive shaft for driving said tube transfer means to move tubes to and from said dedimpler station;

cam means including a cam and a cam follower engageable

with said cam, one of said cam and cam follower engageable with said cam, one of said cam and cam follower being connected to said dedimpler plug and the other of said cam and cam follower being mounted to said rotating



drive shaft of said drive means such that in response to rotation of said drive shaft said cam and cam follower cause said dedimpler plug to move between said extended position and said retracted position in timed sequence with the movement of tubes to and from said dedimpler station.

5,159,826

DIE SET FOR MANUFACTURING FINS OF HEAT EXCHANGERS AND A MANUFACTURING DEVICE USING THE SAME

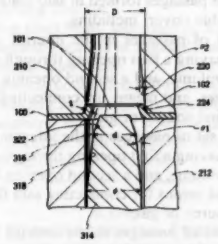
Toshiki Miyazawa; Masahide Sakaguchi, and Hideki Okabe, all of Tokyo, Japan, assignors to Hidaka Seiki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 11, 1991, Ser. No. 728,734

Claims priority, application Japan, Jul. 19, 1990, 2-191082; Sep. 13, 1990, 2-243005

Int. Cl.[5] B21D *53/04*

U.S. Cl. 72—358 **25 Claims**



1. A die set for manufacturing fins of heat exchangers, comprising:

a punch and a die for forming a projected section, which is formed along an edge of a hole punched in a metal plate, into a collar with a prescribed height,

said die has a hollow section into which said punch enters; and

an outer circumferential face of said punch is a tapered face in the form of a truncated cone, a corner section being formed at an end of the tapered face positioned a predetermined distance from a front end of the punch, a slope of an outer side of the punch changing at the corner section, the punch having a predetermined length from the end thereof to the corner section,

wherein said tapered face faces an inner face of said die when the front end section of said punch proceeds beyond the front end of said projected section, which is held between the outer circumferential face of said punch and the inner face of said die, and said projected section is extruded by reduction of the distance between the outer circumferential face of said punch and the inner face of said die, which hold said projected section therebetween, caused by movement of said tapered face of said punch into the hollow section of said die, the predetermined length of the punch from the end thereof to the corner section being established such that said corner section is moved through and beyond said projected section as said projected section is extruded.

5,159,827

TRANSFERRING APPARATUS FOR TRANSFER PRESS

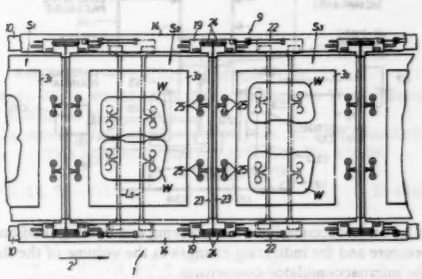
Motoatsu Shiraishi; Tatsuo Nagamitsu, and Mitsuki Nakamura, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 17, 1991, Ser. No. 686,458

Claims priority, application Japan, Apr. 19, 1990, 2-104141; Aug. 22, 1990, 2-220749

Int. Cl.[5] B21D *43/05*

U.S. Cl. 72—405 **4 Claims**



1. A transferring apparatus for a transfer press machine which includes a plurality of working stations, wherein the working stations have lower dies and upper dies cooperating to press workpieces and are arranged in a work-transferring direction, the transferring apparatus sequentially transferring the workpieces from the working stations to the succeeding working stations, said apparatus comprising:

a pair of guide bars extending in the transferring direction and mounted on opposite sides of the working stations;

means for providing an up-and-down movement of said pair of guide bars;

a pair of feed plates each supported on the corresponding guide bar;

means for providing movement of said pair of feed plates in the transferring direction relative to said corresponding guide bars;

carriages carried on each of the feed plates in correspondence to each of the work stations;

shift means associated with each of the carriages for shifting the carriage in the transferring direction relative to the feed plate;

cross bars each bridged over a pair of said carriages and capable of holding the workpiece;

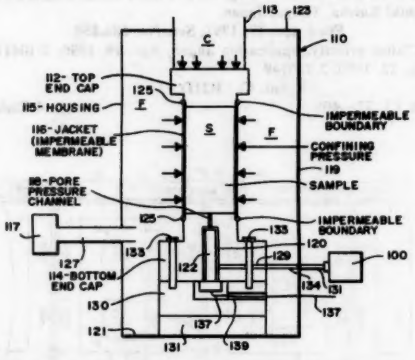
said shift means varying, in the transferring direction, a movement of the carriages associated with at least one of the working stations relative to movement of the carriages associated with other of said working stations during operation of the transferring apparatus so that the workpieces can be transferred between working stations spaced different distances from one another.

5,159,828

MICROACCUMULATOR FOR MEASUREMENT OF FLUID VOLUME CHANGES UNDER PRESSURE

Ronald P. Steiger, Houston, and Peter K. Leung, Sugar Land, both of Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Aug. 31, 1990, Ser. No. 577,338
Int. Cl.[5] G01N *15/08*
U.S. Cl. 73—38 13 Claims



1. A microaccumulator for receiving and holding fluid under pressure and for indicating changes in the volume of the fluid, the microaccumulator comprising:

a body for an interior cavity,

a piston movably and sealingly disposed in a bore in the cavity,

a fluid channel extending from an exterior surface of the body to the interior cavity through which fluid to be received and held may pass into a first portion of the interior cavity on a first side of the piston, wherein the fluid received into the interior cavity is proportional to an amount of sample fluid expelled from a rock sample during a triaxial test of the sample, the sample expelling the sample fluid into a test channel of a triaxial test apparatus disposed adjacent an end of the sample, the test channel in fluid communication with the fluid channel of the microaccumulator, and for each cubic centimeter of sample fluid in the sample prior to testing between 12.5 to 0.05 microliters are expelled from the sample and measured during testing,

indicator means in the interior cavity for indicating the amount of fluid in the interior cavity,

the indicator means comprising a linear variable differential transformer with a shaft movable in a coil winding, the shaft connected to the piston so that movement of the piston moves the shaft in the coil to produce a signal indicative a change in volume of fluid in the first portion of the interior cavity, and

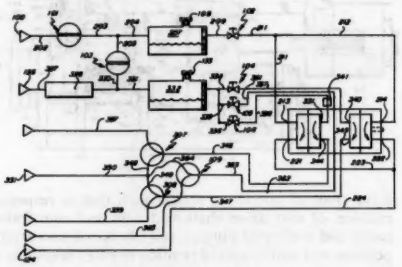
a pressure control channel extending from an exterior surface of the body to the interior of the cavity through which pressure control fluid may pass into a second portion of the cavity on a second side of the piston opposite the first side of the piston.

5,159,829

DEVICE FOR MEASURING GAS PERMEATION

Daniel W. Mayer, St. Paul, and Robert L. Neiss, St. Michael, both of Minn., assignors to Modera Controls, Inc., Minneapolis, Minn.

Continuation of Ser. No. 630,161, Dec. 19, 1990, Pat. No. 5,107,696. This application Jan. 17, 1992, Ser. No. 822,366
The portion of the term of this patent subsequent to Apr. 28, 2009, has been disclaimed.
Int. Cl.[5] G01N *15/08*; G01M *3/00*
U.S. Cl. 73—38 11 Claims



1. Apparatus for measuring gas permeability of a membrane material, comprising:

a. a material volume formed of a solid metal block having high thermal conductivity characteristics so as to maintain a substantially uniform temperature throughout all regions of its volume;

b. at least one first cavity formed on an exterior surface of said material volume, said at least one first cavity being surrounded by a peripheral flat surface formed on said exterior surface;

c. at least one removable cover sealably affixable against said peripheral flat surface, said at least one cover having a second cavity which is alignable with said at least one first cavity, including means for clamping said membrane material between said cavities;

d. a plurality of passages formed in said material volume and said removable cover, including

i) a first set of passages in the interior of said material volume, having a first opening through a surface of said material volume, and a second opening into one of said first cavities, and means for connecting said first opening to a first source of gas;

ii) a second set of passages in the interior of said material volume, having a first opening through a surface of said material volume, and a second opening into said second cavity, and means for connecting said first opening to a second source of gas;

iii) a third set of passages in the interior of said material volume, having a first opening into one of said first cavities, and a second opening through a surface of said material volume;

iv) a fourth set of passages in the interior of said material volume, having a first opening into said second cavity, and a second opening through a surface of said material volume;

e. means for connecting a gas detector to one of said second openings of said third set of passages or said fourth set of passages;

f. a fifth set of passages in the interior of said material volume, said fifth set of passages having a first and second opening through a surface of said material volume; and

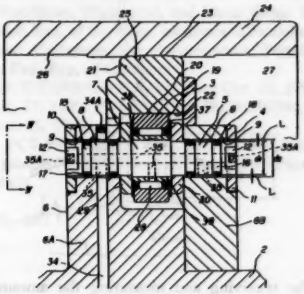
g. means for connecting the first and second openings of said fifth set of passages to a source of heat transfer liquid whereby the heat transfer liquid passing through said fifth set of passages determines the temperature of the entire material volume and passages therein.

5,159,830

MACHINE FOR TESTING CENTRIFUGAL LOAD OF BEARING

Hiroshi Inoue, Chigasaki; Takehiko Hara, Yokohama, and Kengo Hidano, Fujisawa, all of Japan, assignors to Nippon Thompson Co., Ltd., Tokyo, Japan

Filed May 13, 1991, Ser. No. 698,849
Claims priority, application Japan, May 28, 1990, 2-137680
Int. Cl.[5] G01M *19/00*
U.S. Cl. 73—118.1 **2 Claims**



1. A machine for testing a centrifugal load of a bearing including an outer race member, comprising

a supporting frame including a sun ring, and

a rotational main shaft including mounting portions for mounting the bearing to be tested, said mounting portions including a mounting shaft for mounting the bearing to be tested and a supporting bracket for supporting said mounting shaft,

said mounting portions being fixedly projected integrally from an outer peripheral portion of said rotational main shaft at an equal interval in a circumferential direction,

each of said mounting portions having the same structure,

said mounting shaft being arranged in said supporting bracket in parallel with the rotational main shaft in such a manner that a part of an outer peripheral surface of said outer race member is projected radially outwardly from said supporting bracket,

said mounting shaft being journaled to a supporting bracket with a displacing margin in a radially outward direction to said rotational main shaft,

said sun ring being concentric with said rotational main shaft and surrounding said mounting portion, and

an inner peripheral surface of said sun ring being used as a track to be rolled with the outer race members of said respective bearings to be tested.

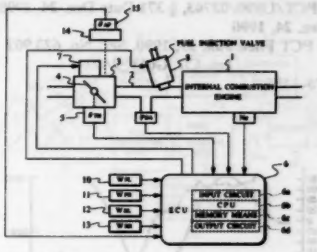
5,159,831

DEVICE FOR CORRECTING ERROR BETWEEN ACCELERATOR PEDAL POSITION SENSOR AND THROTTLE VALVE POSITION SENSOR

Hiroshi Kitagawa; Tetsuya Oono, and Norio Suzuki, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1991, Ser. No. 741,905
Claims priority, application Japan, Aug. 8, 1990, 2-210855
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—118.1 **5 Claims**

1. A device for correcting errors between an output value from an accelerator pedal position sensor for detecting an operating position of an accelerator pedal of a vehicle, and an output value from a throttle valve position sensor for detecting a rotational position of a throttle valve installed in an intake pipe of an engine mounted on said vehicle, the device comprising comparison means for comparing the output value of one of said sensors with reference values consisting of a plurality of different values when said accelerator pedal and said throttle valve are operating in a 1:1 correspondence, learning means operable when one of said sensor output values corresponds to one of said reference values as a result of a comparison made by said comparison means, for learning the output value of the



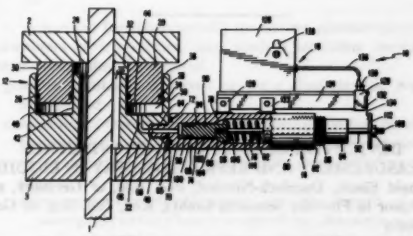
other of said sensors for each of said reference values, and correcting means for correcting the output value from said other sensor by learned values provided by said learning means.

5,159,832

INDICATING DEVICE

Wade White, Carlsbad, N. Mex., assignor to Wada Ventures, Hobbs, N. Mex.

Continuation of Ser. No. 618,954, Nov. 28, 1990, abandoned.
This application Jan. 29, 1992, Ser. No. 826,687
Int. Cl.[5] E21B *47/00*
U.S. Cl. 73—151 **22 Claims**



1. (Thrice Amended) An apparatus comprising:

a reciprocally moving part driven by a reciprocal driving load, and

an indicating device for indicating variations in the reciprocal driving load comprising:

reciprocating moving means operably connectible to said reciprocally moving part for reciprocally moving in response to the reciprocation of said reciprocally moving part and for acting on and pressurizing a fluid to a pressure in accordance with the driving load;

indicating means for providing an indication; and

switch means for switching between an open state and a closed state, and for causing said indicating means to provide said indication when said witch means is in one of said open and closed states, said switch means being operably connected to said pressurized fluid to be switched thereby to said one of said open and closed states once during each cycle of said reciprocating movement of said reciprocating moving means.

5,159,833

ANALYZING A HYDROCARBON RESERVOIR BY DETERMINING THE RESPONSE OF THAT RESERVOIR TO TIDAL FORCES

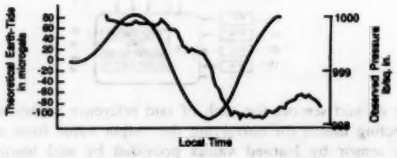
Peter Graebner, Santa Ana, Calif., assignor to Chevron Research and Technology Company, San Francisco, Calif.

PCT No. PCT/US90/03743, § 371 Date Dec. 24, 1990, § 102(e) Date Dec. 24, 1990

PCT Filed Jun. 29, 1990, Ser. No. 623,902

Int. Cl.[5] G01V *9/00*

U.S. Cl. 73—155 **1 Claim**



1. A method for determining connectivity between wells within a reservoir comprising:

(a) creating a hydraulic signal within at least one well;

(b) measuring a variable responsive to tidal forces within at least one other well within said reservoir over a measurement time period;

(c) determining a theoretical earth-tide for said reservoir over said measurement time period;

(d) determining the residual time serials by comparing said variable measurements and said theoretical earth-tide determinations; and

(e) analyzing said residual time serials to determine the amplitude and delay time of receipt of said hydraulic signal.

5,159,834

DEVICE FOR OPTOELECTRONIC INTERFACE MEASUREMENT AND REFRACTOMETRY IN LIQUIDS

Ronald Eisele, Daenisch-Nienhof, Fed. Rep. of Germany, assignor to Fibronix Sensoren GmbH, Kiel, Fed. Rep. of Germany

Filed Apr. 4, 1991, Ser. No. 679,684

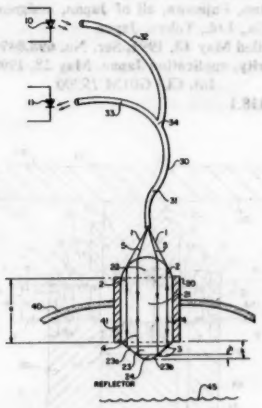
Claims priority, application Fed. Rep. of Germany, Apr. 5, 1990, 4010948

Int. Cl.[5] G01F *23/28*

U.S. Cl. 73—293 **10 Claims**

1. Apparatus for optoelectronic interface in and for refractometry in liquids comprising:

light transparent sensing means for sensing liquid level comprising a generally cylindrical part, means for introducing collimated light into one end of said cylindrical part, and reflecting means optically coupled with said cylindrical part at the opposite end thereof comprising a circular cone having a base for receiving light from and transmitting light to said cylindrical part and having a conical lateral surface for providing an interface between said cone and a liquid medium when liquid medium reaches a level to wholly or partially immerse said conical lateral surface and for thereupon reflecting a first amount of collimated light into said cylindrical part, and for reflecting a different amount of light into said cylindrical part when said conical lateral surface is in contact with a different medium; and



means for receiving and measuring the amount of light passed into said cylindrical part from said reflecting means.

5,159,835

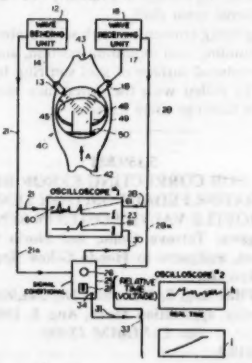
CHECK VALVE TESTING SYSTEM

Steven Nafziger, Chamblee, and John A. McMennamy, Marietta, both of Ga., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 597,441, Oct. 15, 1990, abandoned, which is a continuation of Ser. No. 467,911, Jan. 22, 1990, Pat. No. 4,977,778, which is a continuation of Ser. No. 353,807, May 18, 1989, abandoned, which is a continuation of Ser. No. 924,837, Oct. 29, 1986, abandoned. This application Feb. 12, 1991, Ser. No. 654,253

Int. Cl.[5] G01N *29/00*

U.S. Cl. 73—584 **38 Claims**



1. Method of testing the operating condition of a fluid flow check valve including a movable disk assembly positioned in a valve chamber, said method comprising the steps of:

locating a sound wave sending and a sound wave receiving unit at the check valve;

directing sound wave at the movable disk assembly;

receiving reflected sound wave reflected off the movable disk assembly;

observing the time lapse between directing of the sound wave and receipt of the reflected sound wave;

determining the position of the movable disk assembly within the valve chamber in response to the observed time lapse;

whereby the position of the movable disk assembly is determined.

5,159,836

PROCESS AND DEVICE FOR MONITORING THE CHIP-REMOVING TREATMENT OF A WORKPIECE

Eckhard Waschkies, Blieskastel, and Klaus Hepp, Rubenheim, both of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Forderung Der Angewandten Forschung E.V., Munich, Fed. Rep. of Germany

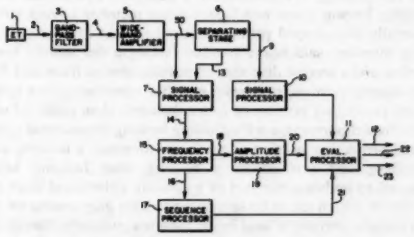
PCT No. PCT/DE89/00572, § 371 Date Oct. 17, 1990, § 102(e) Date Oct. 17, 1990, PCT Pub. No. WO90/02944, PCT Pub. Date Mar. 22, 1990

PCT Filed Sep. 2, 1989, Ser. No. 582,870

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1988, 3829825

Int. Cl.[5] G01N *29/14*

U.S. Cl. 73—587 **20 Claims**



1. Process for the monitoring of the chip-removing treatment of a workpiece, especially in lathe turning, by analyzing the sound emission detectable on a tool comprising the steps of:

transforming the sound emission with the aid of an electro-acoustic transformer into an electrical sound emission signal;

filtering the electrical sound emission signal;

comparing the electrical sound emission signal with respect to its amplitude average over a prescribed period of time with a given adaptable threshold value;

separating the electrical sound emission signal into a continuous background noise signal resulting from cutting noise and friction noise of the tool and pulse-type chip break signals superposed with respect thereto having a higher amplitude;

separately analyzing the background noise signal and the pulse-type chip break signals; and

evaluating the background noise signal and the pulse-type chip break signals.

5,159,837

ULTRASONIC WAVE OBSTACLE SENSOR

Shunichi Wada, Himeji, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan

Filed Jan. 24, 1991, Ser. No. 645,511

Claims priority, application Japan, Feb. 1, 1990, 2-20451

Int. Cl.[5] G01N *29/00*; G08G *1/00*

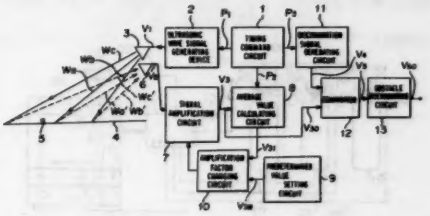
U.S. Cl. 73—602 **4 Claims**

1. An ultrasonic wave type obstacle sensor which comprises:

ultrasonic wave generating means for transmitting intermittently ultrasonic waves to a road surface obliquely and forwardly at a predetermined timing,

ultrasonic wave receiving means for receiving the ultrasonic waves reflected from the road surface,

comparing means for outputting an obstacle detecting signal when a signal from the ultrasonic wave receiving means exceeds a predetermined judgment level, and



obstacle discriminating means for outputting an obstacle discriminating signal when the pulse width of the obstacle detecting signal is grater than or equal to a predetermined width.

5,159,838

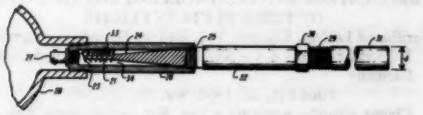
MARGINALLY DISPERSIVE ULTRASONIC WAVEGUIDES

Lawrence C. Lynnworth, Waltham, Mass., assignor to Panametrics, Inc., Waltham, Mass.

Filed Jul. 27, 1989, Ser. No. 385,901

Int. Cl.[5] G01N *29/04*

U.S. Cl. 73—644 **68 Claims**



1. A method for ultrasonically measuring selected physical parameters of a specimen, said method including improvements comprising the steps of

generating ultrasonic waves having a characteristic wavelength, and

configuring a marginally dispersive waveguide for transmitting the ultrasonic waves into the specimen in a selectively dispersive manner, the configuring step including the steps of

selecting waveguide diameters over the length of the waveguide so the phase velocity of the ultrasonic waves in the waveguide, averaged over the entire length of the waveguide, exceeds ninety percent of the square root of the ratio of Young's Modulus to waveguide material density,

selecting waveguide diameters so that said diameters are less than one wavelength and greater than twenty-five percent of wavelength over substantially the entire length of the marginal dispersive waveguide.

5,159,839

APPARATUS FOR GAUGING HIGH PRESSURE GAS, IN PARTICULAR THE SUPPLY OF OXYGEN GAS ON BOARD AN AIRCRAFT

Gérard Silber, Chilly, and Gilles Renner, Palaiseau, both of France, assignors to Societe de Fabricaiton d'Instruments de Mesure, Massy, France

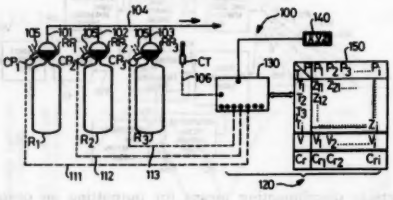
Filed Jun. 5, 1990, Ser. No. 534,093

Int. Cl.[5] G01L *9/00*

U.S. Cl. 73—714 **14 Claims**

1. Apparatus for supplying gaseous oxygen on board an

aircraft, the apparatus comprising a plurality of gas tanks having their outlets interconnected, wherein each individual tank is provided both with a pressure regulator connected to a common low pressure outlet duct, and with a pressure sensor producing a signal proportional to the pressure in each individual tank, with each pressure sensor being connected to a calculation and storage unit suitable for determining the content of



each individual tank on the basis of the signal associated therewith and taking account of the coefficient of compressibility of the oxygen contained in each individual tank on the basis of data stored in said calculation and storage unit for different values of pressure, and consequently deducing the overall available content, said calculation and storage unit further including a readout for displaying said overall available content.

5,159,840

METHOD AND APPARATUS FOR MEASURING, REGULATING AND CONTROLLING THE QUANTITY OF FIBER TUFTS IN FLIGHT

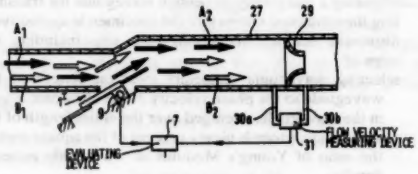
Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trüzschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany

Filed Feb. 20, 1990, Ser. No. 481,595

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1989, 3905139

Int. Cl.[5] G01F *1/30*

U.S. Cl. 73—861.73 **4 Claims**



1. An apparatus for measuring the quantity of fiber tufts during flight thereof in a fiber tuft stream having a direction of flow, comprising

(a) an impact element having an impact face arranged in the flow path of the fiber tuft stream and being exposed for collision with the fiber tufts; said impact face being situated at an oblique angle to said direction of flow; said impact element comprising a comb-shaped component having a plurality of parallel-extending tines spaced sufficiently closely to prevent the fiber tufts from passing therebetween;

(b) a measuring element operatively connected to said impact element for generating signals induced by the collision of fiber tufts with said impact face; and

(c) an electronic evaluating device connected to said measuring element for receiving said signals.

5,159,841

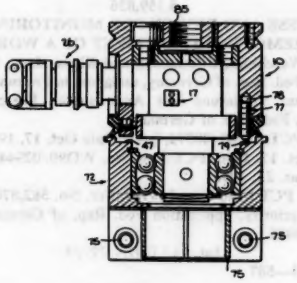
WEB TENSION SENSOR

William W. Montalvo, III, Raymond, and Philip R. Metcalf, Jr., Portland, both of Me., assignors to The Montalvo Corporation, Portland, Me.

Filed Nov. 1, 1990, Ser. No. 607,513

Int. Cl.[5] G01L *5/10*

U.S. Cl. 73—862.474 **3 Claims**



2. A device for supporting a rotating cylindrical member and for sensing forces acting on such a rotating cylindrical member, comprising, in combination: a generally cylindrical body member having a rear end face; a beam member having a first generally disc-shaped portion secured to said end face of the body member; said beam member having a flat middle beam portion and a second disc-shaped portion spaced from said first disc-shaped portion; said beam member terminating in a cylindrical projecting portion of lesser diameter than either of said disc-shaped portions; a self adjusting bearing around said cylindrical projecting portion of the beam member; a housing surrounding said self adjusting bearing, said housing being adapted to embrace the end of a rotating cylindrical shaft the forces on which are to be sensed, and strain gage means on the flat middle portion of said beam member, whereby forces are transmitted by the housing through the bearing to the beam member and sensed by the strain gage and spring-plungers mounted between said body member and said housing to allow for axial movement in response to shaft expansion, which spring-plungers will shear in the event of failure of shaft roller assembly bearings to protect the beam from damage.

5,159,842

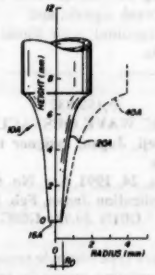
SELF-CLEANING PIPETTE TIPS

Harvey J. Palmer, Lima, and Richard L. Columbus, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 19, 1991, Ser. No. 717,551

Int. Cl.[5] B01L *3/02*

U.S. Cl. 73—864.01 **4 Claims**



1. A self-cleaning pipette tip for aspirating and dispensing liquid of a surface tension from about 35 to 70 dynes/cm,

without adverse effects due to liquid portions left on the exterior of the tip, said tip comprising

a wall shaped to define a confining chamber about an axis of symmetry,

means in said wall defining an aperture fluidly connected to said chamber, said means including a terminal surface of said wall having a generally circular shape with a radius R_o centered on said axis, wherein R_o satisfies the equation

$$R_o < (\sigma/\rho g)^{1/2} \text{ and} \quad \text{(I)}$$

σ = the surface tension of the liquid, ρ = the mass density of the liquid and g = the gravitational constant of 980 cm/sec^2,

the exterior shape of said wall as it extends from said terminal surface a distance that at least exceeds R_o, being constantly changing such that the rate of change of the curve's distance z from said terminal surface with respect to the rate of change of the curve's distance r from said axis, follows the equation

$$dz/dr < (\sigma^2/(\rho g r^2)^2 - 1)^{1/2} \quad \text{(II)}$$

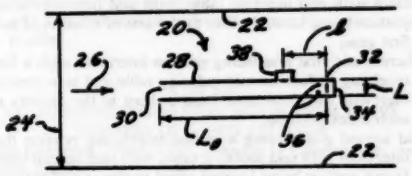
where dz/dr is the derivative of z with respect to r, which is the local slope of the exterior surface.

5,159,843

ACOUSTIC DEVICE AND METHOD FOR MEASURING GAS DENSITIES

Parthasarathy Shakkottai, Duarte; Eug Y. Kwack, Walnut, and Lloyd Back, La Canada, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Feb. 19, 1991, Ser. No. 658,477
Int. Cl.[5] G01N *29/00, 29/22*
U.S. Cl. 73—24.05 **27 Claims**



1. An apparatus for measuring sound pressure values of a gas comprising:

a small tube having a first end and second end, a gas inlet, and a small acoustical opening at a predetermined point between the first and second ends;

transmitting means at one of the ends of the small tube, for transmitting a sound wave into the small tube, the transmitting means closing the small tube at said one of the ends; and

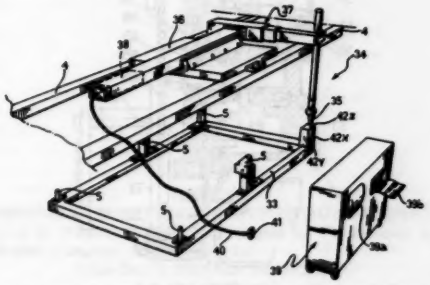
sound receiver means located at the small acoustical opening, for detecting sound pressure values at the predetermined point.

5,159,844

METHOD AND A DEVICE FOR CHECKING FIXTURES USED IN MACHINES OR STATIONS IN PRODUCTION LINES OR INSTALLATIONS

Giancarlo Alborante, Trofarello, Italy, assignor to Comau SPA, Torino, Italy

Filed Apr. 19, 1991, Ser. No. 689,588
Claims priority, application Italy, Apr. 20, 1990, 67297 A/90
Int. Cl.[5] G01B *5/20*; G01M *19/00*
U.S. Cl. 73—865.9 **3 Claims**



1. A method of checking fixtures used in machines of a production installation, wherein said method comprises the following steps:

a) providing at least one coordinate-checking unit (34) comprising:

a support structure,

at least one feeler head carried by the support structure and movable relative thereto so that said feeler head can travel along any path in space, and

electronically-controlled actuator means carried by the support structure for controlling movement of the feeler head,

b) providing a separate stationary electronic control unit near each machine, for controlling the actuator means of the coordinate-checking unit in order to move the feeler head according to a predetermined program adapted to a specific arrangement and configuration of the fixtures of each machine,

c) moving the checking unit along the installation and stopping the checking unit successively in correspondence with the machine whose fixtures are to be checked, at least for a period of time necessary to check the fixtures,

d) connecting the actuator means of the checking unit to the stationary control unit near each machine after the checking unit has stopped at each specific machine and checking the coordinates of the fixtures according to the corresponding predetermined program,

e) disconnecting the stationary control unit from the actuator means of the checking unit after the checking has been carried out at a specific machine to enable the checking unit to be moved to the next machine,

f) displaying the results of the checking by means of the stationary control unit near each machine in order to identify any fixtures which are displaced from their correct positions and to determine the extent of any displacement.

5,159,845

ENGINE STARTER

Minoru Wada; Yoshiaki Tanaka; Hiroshi Katoh, and Hiroshi Taguchi, all of Tokyo, Japan, assignors to Komatsu Zenoah Kabushiki Kaisha, Tokyo, Japan

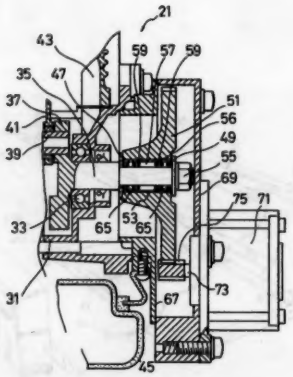
PCT No. PCT/JP88/00731, § 371 Date Nov. 10, 1989, § 102(e) Date Nov. 10, 1989, PCT Pub. No. WO89/04922, PCT Pub. Date Jun. 1, 1989

PCT Filed Jul. 21, 1988, Ser. No. 391,506

Claims priority, application Japan, Nov. 27, 1987, 62-179758; Nov. 27, 1987, 62-179759

Int. Cl.[5] F02N *15/02, 17/00;* F16D *13/04;* H01H *9/06*

U.S. Cl. 74—6 9 Claims



1. An engine unit comprising:

an engine having a rotatable crankshaft;

a starter motor having a rotary shaft for supplying rotational power for rotating the crankshaft to start the engine;

a drive gear adapted for rotation by the rotational power supplied by the rotary shaft of the starter motor;

a driven gear adapted for rotation relative to the crankshaft, and concentric with the crankshaft, wherein the driven gear is engaged with the drive gear for rotation responsive to rotation of the drive gear;

clutch means coupling the driven gear and the crankshaft, for connecting and disconnecting the crankshaft and the driven gear to transmit and receive the rotational power supplied by the starter motor so that when the starter motor is driven to start the engine, the crankshaft is connected to the driven gear, and so that after the engine is started, the crankshaft is disconnected from the driven gear; and

an ignition circuit, a power source and a switching device including,

a first, push-button switch for electrically connecting the starter motor to the power source;

a second, change-lever switch for electrically connecting the ignition circuit to the power source, wherein the second switch is arranged side-by-side with the first switch, and wherein the change-lever of the second switch is pivoted for movement; and

a transverse plate slidable between a first position in which the plate is depressible so that the first switch is pressed down by pushing the plate downwardly, and a second position is which the plate is not depressible, wherein the plate includes a hole for engaging the change-lever of the second switch to connect and disconnect the ignition circuit from the power source in accordance with sliding movement of the plate between the first position and the second position.

5,159,846

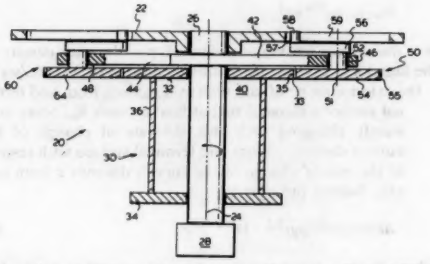
APPARATUS FOR MOVING AN INDEXING TABLE

Michael V. Warner, 45 Park Street, E., Mississauga, Ontario, Canada L5G1G8

Filed Aug. 30, 1991, Ser. No. 753,408

Int. Cl.[5] B23Q *17/00*

U.S. Cl. 74—69 21 Claims



1. Apparatus for moving an indexing table and stopping it at a plurality of precisely defined positions, said indexing table being intended for carrying at least one workpiece between said plurality of precisely defined positions so that work can be performed on said workpiece at at least one of said plurality of precisely defined positions; said apparatus comprising:

a first gear mounted so as to be rotatably and translatably movable with respect to said indexing table said first gear having cogs at the perimeter thereof, said cogs having a first side and a second side;

a second gear mounted so as to be rotatably and translatably movable with respect to said indexing table said second gear having cogs at the perimeter thereof, said cogs having a first side and a second side;

a main gear having cogs intended for intermeshing with said cogs of said first and second gears;

moving means for effecting translational motion of said first gear and said second gear with respect to said main gear;

said first and second gears being interconnected such that translational movement of one effects corresponding translational movement of the other;

wherein said first gear and said second gear are each engaged with a main gear, wherein said first gear and said second gear are caused to rotate about their respective center axes when moved translationally by said moving means;

said first gear having a first interfacing portion that interfaces with said indexing table, with said first interfacing portion being located offset to the axis of rotation of said first gear;

wherein said first interfacing portion interfaces with a first receiving surface on said indexing table and is in contact therewith on a continual basis at least in the vicinity of each index position;

said second gear having a second interfacing portion that interfaces with said indexing table, with said second interfacing portion being located offset to the axis of rotation of said second gear;

wherein said second interfacing portion interfaces with a second receiving surface on said indexing table and is in contact therewith on a continual basis at least in the vicinity of each index position;

wherein a first side of said cogs of said first gear contact an opposed first side of said cogs of said main gear, said contact being such that is least one of said cogs of said first gear is in contact with at least one of said cogs of said main gear on a continual basis at least in the vicinity of each index position; and

wherein a second side of said cogs of said second gear contact an opposed second side of said cogs of said main

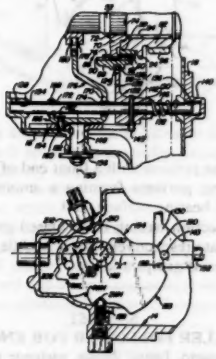
gear, said contact being such that at least one of said cogs of said second gear is in contact with at least one of said cogs of said main gear on a continual basis at least in the vicinity of each index position.

5,159,847

SECTOR PLATE FOR TRANSFER CASE

Randolph C. Williams, Weedsport, and Arthur Bouchard, II, Cazenovia, both of N.Y., assignors to New Venture Gear, Inc., Troy, Mich.

Filed Sep. 12, 1991, Ser. No. 758,588
Int. Cl.[5] F16H *59/10*; B60K *17/354, 23/08*
U.S. Cl. 74—337.5 **27 Claims**



1. A four-wheel drive transfer case comprising:
a housing;
an input shaft supported for rotation in said housing;
an output shaft supported for rotation in said housing;
speed reduction means for selectively interconnecting said input shaft to said output shaft to define a four-wheel High-range mode and a four-wheel Low-range mode;
a shift member movable between a first position for shifting said speed reduction means into said High-range mode and a second position for shifting said speed reduction means into said Low-range mode; and
cam means having a first pathway for moving said shift member to said first position in response to rotation of said cam means in a first direction, and a second pathway for moving said shift member to said second position in response to rotation of said cam means in a second direction, said first and second pathways having dissimilar surface profiles.

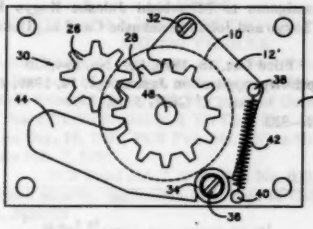
5,159,848

SELF-ADJUSTING MOTOR MOUNT FOR DRIVE MOTORS OF A PEN PLOTTER

James Lawrence, Irvine, Calif., assignor to Calcomp Inc., Anaheim, Calif.

Filed May 2, 1991, Ser. No. 694,559
Int. Cl.[5] F16H *1/12, 35/06*
U.S. Cl. 74—421 A **14 Claims**

1. A self-adjusting motor mount for holding a driving gear mounted on the shaft of a motor in engagement with a driven gear carried by a back plate disposed in a vertical plane comprising:
a) a mounting plate carrying the motor and the driving gear;
b) pivotal mounting means carried by the back plate for attaching said mounting plate to the back plate at a point above the motor for pivotal movement therearound so as to have the motor pivotally hang from said point;
c) bias means for resiliently urging the mounting plate to carry the driving gear in a first direction into engagement with the driven gear; and,



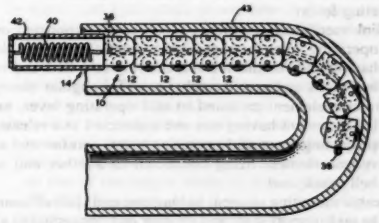
d) shock absorber means carried by the back plate for absorbing pivotal gear-disengaging movement of said mounting plate in a second direction opposite said first direction.

5,159,849

SERPENTINE TUBE INSPECTION POSITIONING SPINE

Robert E. Womack, Forest, Va., assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Oct. 7, 1991, Ser. No. 772,404
Int. Cl.[5] F16C *1/28*
U.S. Cl. 74—502.3 **5 Claims**



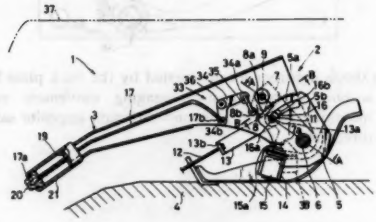
1. A positioning spine, comprising:
a. a plurality of identical links;
b. each link having a longitudinal axis and an axially extending bore;
c. each link having a convex first end and a concave second end spaced along the longitudinal axis with each end having a plurality of flat faces, said concave second end having a complementary size and shape for receiving the convex first end of an adjacent link for mating therewith;
d. means for maintaining rigid straightness of said mated links when under compressive forces and for allowing pivoting of one link relative to an adjacent link, comprising:
i. a cable received through the axial bore of each of said links; and
ii. a spring attached to one end of said cable for maintaining tension on said cable and said links; and
e. a plurality of wheels rotatably mounted on each of said links where the planes of rotation of said wheels are radial to the longitudinal axis and intersect at substantially the center of the longitudinal axis of the link.

5,159,850

PARKING-BRAKE OPERATING DEVICE

Yasushi Naoi, Kawasaki; Kenichi Kobayashi, Yokohama; Harutoshi Ota, Ueda, and Yasushi Kuribayashi, Ueda, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo and Johan Seisakusho Co., Ltd., Ueda, both of, Japan

Filed Oct. 10, 1990, Ser. No. 594,920
Claims priority, application Japan, Apr. 14, 1989, 1-93227
Int. Cl.[5] G05G *5/18, 7/04*
U.S. Cl. 74—523 **9 Claims**



1. A parking-brake operating device, comprising:

a braking-force holding mechanism including a plate-like bracket having a ratchet wheel and mounted at a location adjacent a seat on a body floor, a swing arm mounted to said bracket for angular movement, and a ratched pawl supported on said swing arm for angular movement to selectively engage with and disengage from said ratchet so as to hold said swing arm relative to said bracket;

an operating lever supported on said bracket coaxially with said swing arm and for angular movement, said operating lever having at least one opening;

a support shaft mounted on said swing arm and loosely fitted in said opening so as to permit a predetermined amount of relative movement between said swing arm and said operating lever;

a link mechanism including a bell crank supported on said operating lever for angular movement, and a link element having ends connected respectively to a first end of said bell crank and to said ratchet pawl for angular movement;

a release element mounted to said operating lever, said release element having one end connected to a release knob projecting from said operating lever, another end of said release element being connected to another end of said bell crank; and

a cable mounting element having one end thereof connected to said support shaft and another end connected to a brake control cable.

5,159,851

BICYCLE GRIP

Paul Rahmes, 245 W. Marquita, Suite H, San Clemente, Calif. 92672

Filed Sep. 18, 1991, Ser. No. 762,545
Int. Cl.[5] B62K *21/26*
U.S. Cl. 74—551.9 **18 Claims**

1. A bicycle brake grip, comprising

a body member having a rear section including a curved rear wall that conforms generally to a segment of a bicycle handle bar on which the grip is to be mounted, and a forward section extending outwardly from said handle bar on which the grip is to be mounted,

in the rear section, an upper surface in the form of a palm saddle oriented substantially horizontal when the bicycle is in a upright position, a rocker ridge along an outer rear edge of the palm saddle, and a thumb ledge on an inner side of the body member which terminates at an outer end in a thumb pad and expands rearwardly from the thumb pad as a curved surface that has a wide rear end which merges with the palm saddle at an inside edge of the saddle,

in the forward section, an outwardly projecting wedge element terminating at an outer end in a semi-rounded tip, and having a base which merges at a lower, inner side portion with the curved surface of the thumb ledge and at

a lower, rear portion with a front end of the palm saddle, said merging portions forming a smooth, rounded, enlarged load bearing surface, and

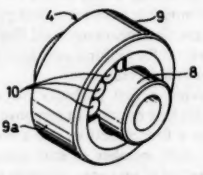
a lever arm section having three biased grooves shaped to accommodate respectively index, middle, and ring fingers when the hand grasps a lever.

5,159,852

ROLLER FOLLOWER FOR ENGINE

Kazuyoshi Harimoto, Iwata, Japan, assignor to NTN Corporation, Osaka, Japan

Filed May 3, 1991, Ser. No. 695,136
Claims priority, application Japan, Feb. 28, 1991, 3-34152
Int. Cl.[5] F01L *1/18;* G05G *1/00*
U.S. Cl. 74—559 **2 Claims**



1. A roller follower for use with an engine, said roller follower comprising:

a roller adapted to be in rolling contact with a cam on a camshaft, said roller being formed with a multiplicity of minute recesses arranged at random so that a SK value parameter representing the surface roughness is less than zero and so that a ratio of a total area of said minute recesses to an entire area of said roller is 10 to 40 percent, a maximum area of said minute recesses being 15,000 square microns.

5,159,853

TRILATERAL TRACK BICYCLE PEDAL

Peter O. Gibson, 6316 Greenspring Ave., #307, Baltimore, Md. 21209

Filed Feb. 20, 1992, Ser. No. 838,020
Int. Cl.[5] G05G *1/14;* A43B *5/00*
U.S. Cl. 74—594.6 **10 Claims**

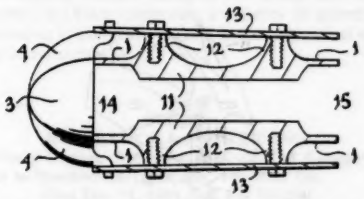
1. A bicycle pedal enabling engagement by a cleat in a direction lateral to the bicycle;

said pedal having a longitudinal axis, a central body, one free

end and one fixed end, a lead attached to said body at said free end and two substantially identical opposed tracks disposed parallel to said longitudinal axis;

said central body being disposed longitudinally, enclosing said longitudinal axis and further having two opposed longitudinally disposed convex surfaces which are symmetrically arcuate about said longitudinal axis and terminate at said pedal free and fixed ends;

each said track being bounded by a set of surfaces comprising one of said two central longitudinally disposed convex



surfaces and two apposed laterally distal planar side surfaces each projecting inwardly, juxtaposed to said central longitudinally disposed convex surface each said distal planar side surface connected to the central body by at least two struts;

said lead having a central head and two lateral fins, said central head having an exterior surface flush each said opposed central longitudinally convex surfaces and said two lateral fins being disposed in front of the area between said two substantially identical opposed tracks.

5,159,854

GEAR DRIVE UNIT

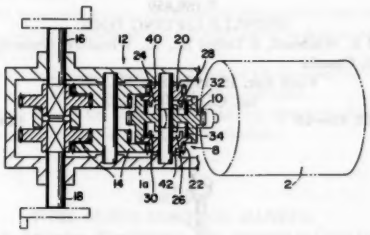
Kaoru Mino, Konan, and Kazuo Yokoigawa, Mibu, both of Japan, assignors to Zexel Corporation, Tokyo, Japan

Filed Jul. 23, 1991, Ser. No. 734,687

Claims priority, application Japan, Jul. 31, 1990, 2-202747

Int. Cl.[5] F16D *13/08, 47/00;* **F24F** *13/15*

U.S. Cl. 74—810.1 **3 Claims**



1. A gear drive unit, comprising:

a motor rotatable in forward and reverse directions and having an output shaft;

a worm fixedly mounted on said output shaft of said motor;

a worm wheel having gear teeth meshed with said worm;

a twin-shaft selective output mechanism including first and second driven gears, and first and second overrunning clutch mechanisms capable of selectively driving one of said first and second driven gears depending on the direction of rotation of said worm wheel;

first and second reduction gears held in mesh with said first and second driven gears, respectively, of said twin-shaft selective output mechanism;

first and second output shafts connected with said first and second reduction gears, respectively, and adapted to be connected with first and second driven members; and

wherein said first and second overrunning clutch mechanisms of said twin-shaft selective output mechanism are disposed inside said worm wheel and on respectively opposite sides of said gear teeth of said worm wheel.

5,159,855

CONTINUOUSLY VARIABLE DRIVING UNIT OF A MOTOR VEHICLE

Heinrich Nikolaus, Hamburg, and Robert Paton, Neukirchen am Inn, both of Fed. Rep. of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Fed. Rep. of Germany

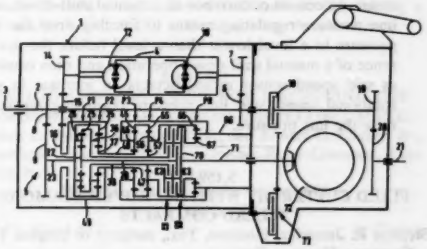
PCT No. PCT/EP90/01105, § 371 Date Dec. 19, 1991, § 102(e) Date Dec. 19, 1991, PCT Pub. No. WO91/01460, PCT Pub. Date Feb. 7, 1991

PCT Filed Jul. 7, 1990, Ser. No. 778,821

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1989, 3923225

Int. Cl.[5] F16H *59/74*

U.S. Cl. 74—850 **5 Claims**



1. A continuously variable driving unit with a power split for motor vehicles, especially tractors and other working machines,

in which via a power take off a hydrostatic power branch (4) and a mechanical power branch (5) are driven by an input shaft (2),

in which said hydrostatic power branch (4) has a constantly variable primary hydrostatic engine (10) and a secondary hydrostatic engine (12),

in which said hydrostatic and said mechanical power branches (4, 5) are brought together in a coupling transmission of a planetary design and

in which at maximum displacement in said hydrostatic branch (4) the sum of speeds from mechanical and hydrostatic transmission branches (4, 5) results in a zero speed on one of the output shafts of said coupling transmission (56, 90), characterized in that during a starting operation, displacement in said hydrostatic branch (4) is adjusted to a minimum and after starting said driving unit, shift elements for two speed ranges are connected with said transmission output shaft (71).

5,159,856

AUTOMATIC TRANSMISSION LINE PRESSURE CONTROL SYSTEM

Hiroshi Yoshimura; Masahito Kitada, both of Hiroshima; Koichiro Takeuchi, Hatsukaichi, and Junichi Doi, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 24, 1991, Ser. No. 764,687

Claims priority, application Japan, Sep. 28, 1990, 2-261075; Jun. 17, 1991, 3-144784

Int. Cl.[5] B60K *41/06*

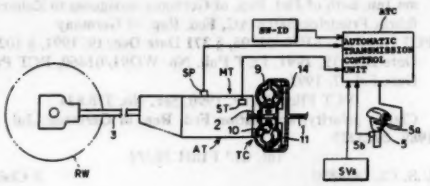
U.S. Cl. 74—867 **10 Claims**

1. An automatic transmission line pressure control system for controlling line pressure in an automatic transmission equipped with a torque convertor for hydraulically coupling and un-coupling friction coupling elements so as to shift the automatic transmission into desired speed gears, said automatic transmission line pressure control system comprising:

line pressure regulating means for regulating line pressure to the friction coupling elements;

shift-down sensor means for detecting an occurrence of a manual shift-down;

speed sensor means for detecting a rotational speed transmitted to the automatic transmission;



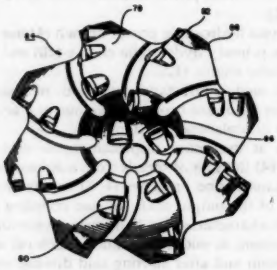
control means for causing, when said shift-down sensor means detects an occurrence of a manual shift-down, said line pressure regulating means to forcibly drop the line pressure to a level lower than a level before the occurrence of a manual shift-down operation and then causing, as said speed sensor means detects an increase in said rotational speed, said line pressure regulating means to raise the line pressure.

5,159,857

FIXED CUTTER BIT WITH IMPROVED DIAMOND FILLED COMPACTS

Stephen R. Jurewicz, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Filed Mar. 1, 1991, Ser. No. 663,443
Int. Cl.[5] B21K *5/02*
U.S. Cl. 76—108.2 **5 Claims**



1. A method of manufacturing an improved single piece bit of the type having a body including a solid bit face on one end, the bit face increasing in external diameter between a nose and a gage region, the method comprising the steps of:

forming a diamond filled compact by first forming a hard metal jacket having at least one initially open end and an open interior;

substantially filling the open interior of the jacket with a diamond material;

subjecting the diamond filled jacket to a temperature and a pressure sufficient to sinter the diamond material, thereby integrally forming a diamond core within the hard metal jacket;

reducing the outer dimensions of the hard metal jacket to a size selected to conform to a cutting insert pocket provided on the solid bit face, the improved compact being further characterized as having a top surface comprised of exposed diamond surrounded by a ring of jacket material and wherein at least 75% of the top surface of the compact is exposed diamond; and

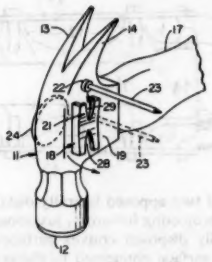
installing the improved compact within an insert receiving pocket provided on the solid bit face.

5,159,858

FRAMING HAMMER CONSTRUCTION

Michael J. Gansen, 4934 Sweetwood Dr., El Sobrante, Calif. 94803

Filed May 17, 1991, Ser. No. 701,851
Int. Cl.[5] B25D *1/00*
U.S. Cl. 81—23 **1 Claim**



1. A framing hammer, comprising

a conventional framing hammer head having a forwardly extending hammering face and rearwardly extending curved claws for pulling nails,

said hammer head formed with a handle receiving socket between said hammering face and said claws,

a handle mounted in said socket to extend laterally from said hammering face and said claws,

a boss formed integrally with said hammer head and protruding from a side of said head in overlying relation to said socket,

said boss being formed with said first and second tapered undercut grooves, with said first groove opening toward said hammer face and said second groove opening toward said claws.

5,159,859

SHINGLE LIFTING TOOL

David E. Whitesell, 6 Talbot St., E., Wheatley, Ontario, N0P 2P0, Canada

Filed Apr. 15, 1991, Ser. No. 685,207
Int. Cl.[5] B25B *33/00*
U.S. Cl. 81—45 **12 Claims**

1. A tool for lifting and rolling for removal of ordinary roofing shingles which have been nailed on roofs, the tool comprising:

(a) an articulated handle having elongated upper and lower

sections joined at an intermediate pivot, the lower section angled forwardly, out of alignment with respect to the upper section, the pivot permitting relative pivotal movement of the lower section with respect to the upper section to vary the angle it makes therewith;

(b) means to secure the lower section at an angle within a range of angles with respect to the upper section and maintains that lower section at that angle during operation of the device; and

(c) a flat blade secured to the free end of the lower section for slipping beneath shingles, for lifting and rolling thereof, the blade comprising a plurality of spaced tines extending in a direction parallel to the longitudinal axis of the lower section.

5,159,860

ROTARY FOR A POWER TONG

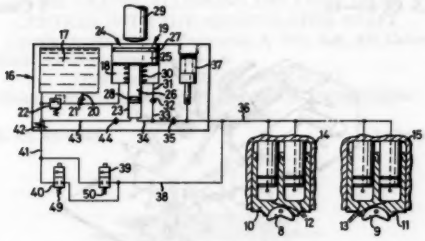
Bernd-Georg Pietras, Wedemark, Fed. Rep. of Germany, assignor to Weatherford/Lamb, Inc., Houston, Tex.

Filed Dec. 11, 1991, Ser. No. 805,090

Claims priority, application United Kingdom, Apr. 12, 1991, 9107826

Int. Cl.[5] B25B *17/00*

U.S. Cl. 81—57.19 **13 Claims**



1. A rotary for use in a power tong, the rotary comprising

a rotary body,

a slave hydraulic piston and cylinder mounted on the body,

a jaw carrier interconnected with the slave hydraulic piston and cylinder,

a master hydraulic piston and cylinder interconnected with the slave hydraulic piston and cylinder, and

retaining means for selectively retaining hydraulic fluid in the slave hydraulic piston and cylinder.

5,159,861

WIRE GUIDE CONTROL HANDLE

Burton A. Anderson, Bloomington, Ind., assignor to Cook Incorporated, Bloomington, Ind.

Filed Sep. 27, 1991, Ser. No. 767,273

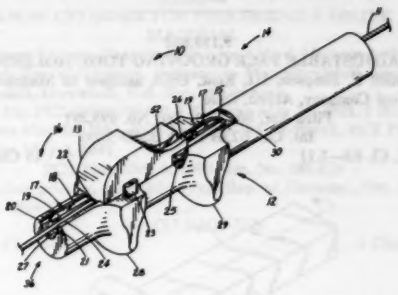
Int. Cl.[5] B25B *3/00*; A61B *19/00*

U.S. Cl. 81—487 **20 Claims**

1. A wire guide control handle comprising:

an elongated member having a proximal portion and a distal portion, said proximal portion having an enclosed passageway extending longitudinally therethrough for passage of a wire guide, said distal portion having a retention channel extending longitudinally therethrough and communicating with said enclosed passageway, said retention channel including a bottom surface having an inclined slot extending longitudinally therein and distally outwardly away from said enclosed passageway for positioning said wire guide therein; and

a thumb slide having a tenon positioned and slidable in said retention channel and also having an inclined projection extending from a surface of said tenon and into said inclined slot for fixedly positioning said wire guide therein,



said inclined projection and said inclined slot having a variable, substantially uniform spacing therebetween.

5,159,862

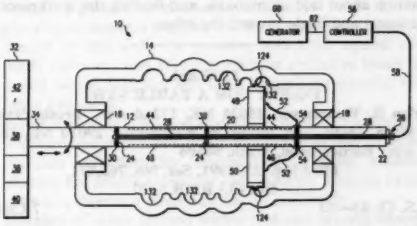
METHOD AND APPARATUS FOR MACHINING THE INSIDE SURFACE OF A CLOSED HOLLOW CASING

Stephen L. Byrnes, Allegany, N.Y., and Robert G. Cosper, Jr., Smethport, Pa., assignors to Dresser-Rand Company, Corning, N.Y.

Filed Jan. 18, 1991, Ser. No. 643,571

Int. Cl.[5] B23B *41/00*

U.S. Cl. 82—1.11 **18 Claims**



15. A method of machining the inside surface of two halves of a hollow casing of a machine with the two halves positioned to form a closed hollow casing, said method comprising the steps of:

rotatably supporting a boring bar in the closed hollow casing along the central axis thereof, said boring bar including an attached support assembly comprising a stationary portion having a support surface formed thereon, a slide portion mounted to said stationary portion for radial movement thereon, a tool block mounted to said slide portion and having a lower surface supported by said support surface during a predetermined portion of the radial movement of said slide portion, a tool bit mounted to said tool block, a cutter insert mounted to said tool bit, and a motor assembly and encoder for controlling the radial movement of said slide portion;

attaching said boring bar to positioning means to provide rotational and axial movement and control of said movement of said boring bar;

rotating said boring bar at a predetermined speed;

moving said boring bar axially to a predetermined location;

moving said slide portion in a radial direction to cause said cutter insert to contact and machine the inside surface of said closed hollow casing; and

attaching an outboard support member to said support assembly, said outboard support member extending radially outwardly from said support assembly and having a sup-

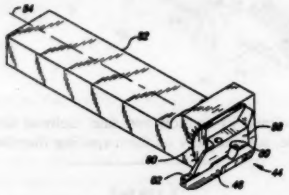
port surface positioned to support said lower surface of said tool block as said lower surface of said tool block moves radially outward beyond the support surface of said stationary portion.

5,159,863

ADJUSTABLE FACE GROOVING TOOL HOLDER

Vandell E. Simpson, III, Kent, Ohio, assignor to Manchester Tool Company, Akron, Ohio

Filed Apr. 30, 1991, Ser. No. 693,391
Int. Cl.[5] B23B *1/00*; B26D *3/06*
U.S. Cl. 82—1.11 **15 Claims**



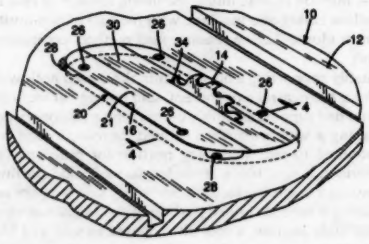
14. In a method of cutting circular end face grooves of different diameters in end faces of workpieces using a cutting insert held on a narrow, curved support blade, comprising the steps of relatively rotating the cutting insert and a workpiece about a first axis, locating the support blade at a first radial distance from said first axis and feeding the workpiece or the insert and blade toward the other; and thereafter locating the support blade at a second radial distance from said first axis, rotatably adjusting the support blade angularly about a second axis parallel to said first axis, locking said blade against further rotation about said second axis, and feeding the workpiece or the insert and blade toward the other.

5,159,864

INSERT FOR A TABLE SAW

Arlan B. Wedemeyer, 15034 NE. 172nd Ave., Brush Prairie, Wash. 98606, and Joseph B. Wedemeyer, 29010 NE. 164th Ave., Battleground, Wash. 98604

Filed Sep. 23, 1991, Ser. No. 763,971
Int. Cl.[5] B27B *5/20*
U.S. Cl. 83—13 **7 Claims**



6. A method of operating a table saw having a table top surface with an elongated recessed throat plate opening, and a circular saw blade mounted to a motor, the saw blade movable vertically to project through the recessed opening above the table top surface or to be positioned below the table top surface, the method comprising:

providing a throat plate having a longitudinal axis and receivable within said throat plate opening and having a central opening for receiving an insert;

positioning an insert made of wood or equivalent material in said central opening of said throat plate;

lowering the saw blade below the table top surface;

positioning said throat plate in said throat plate opening with a top surface of the metal plate, a top surface of the insert, and the table top surface in substantially co-planar relationship;

clamping a board to the table top surface so as to overlay said insert;

applying power to said saw blade to rotate the same;

raising the saw blade upward through the recessed opening in the table top surface and the central opening in the throat plate so as to engage the insert and cut a slot therethrough as the saw blade is raised vertically to project above the table top surface;

stopping said blade; and

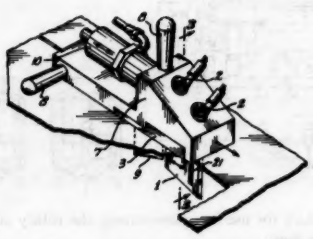
removing the board from the table top surface.

5,159,865

VIBRATION DRIVEN HOT KNIFE FOR SEPARATING BONDED ASSEMBLIES

C. Douglas Hinckley, Federal Way, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Feb. 11, 1992, Ser. No. 833,871
Int. Cl.[5] B26D *7/10*
U.S. Cl. 83—16 **5 Claims**



4. A method for separating the trailing edge of bonded parts of skin panels prior to their removal from an aircraft structure for repair comprising the steps of:

heating a knife blade, said knife blade having a trailing edge;

utilizing a pneumatic source for linearly vibrating said heated knife blade; and,

causing a wedge member to follow the trailing edge of the knife blade and thereby spreading the parts of said bonded parts of skin panels being separated to reduce friction on said knife blade.

5,159,866

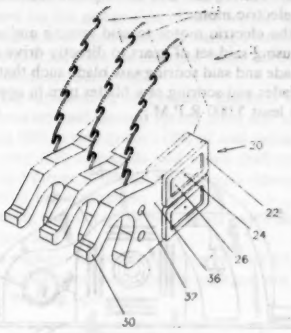
SAW GUIDE WITH SONIC REGULATED GAS LUBRICATION

James L. Dunham, 216 Redwood Ave., Willits, Calif. 95490

Continuation-in-part of Ser. No. 500,399, Mar. 28, 1990, abandoned. This application Oct. 7, 1991, Ser. No. 772,114
Int. Cl.[5] B27B *5/29*; F16C *13/06*
U.S. Cl. 83—169 **7 Claims**

7. An improved saw guide system for use in supporting saw assemblies which includes at least one saw guide adjacent each side of at least one saw blade, the improvement being that said

saw guide is comprised of a gas lubricated bearing block having a gas bearing surface, and means which produce sonic



regulated gas flow across said bearing surface between said bearing surface and said saw blade.

5,159,867

CORE COLLECTING TRAY PROVIDED WITH AN IN-BUILT CLIPPING SYSTEM AND ADJUSTABLE CROSS TRAVEL ALLOWING THE CORE TO BE CENTRED WITH THE MANIPULATOR SHAFT

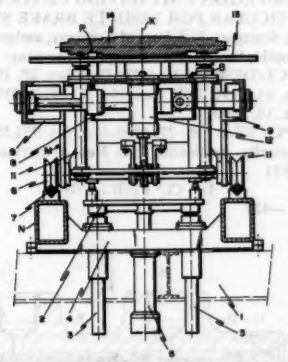
D. Agustin Arana Erana, Zorrostea, 4, Pol. Ind. Ali Gobeo, 01010 Vitoria (Alava), Spain

Filed Jun. 29, 1990, Ser. No. 546,352

Claims priority, application Spain, Jul. 26, 1989, 8902644

Int. Cl.[5] B65G *7/00*

U.S. Cl. 83—418 **2 Claims**



1. A core collecting tray, comprising a clipping system for cores; a tray positioned below said clipping system and having a supporting surface for supporting cores thereon; a fixed bearing frame carrying tracks and having vertical guides; and travel means for moving the cores to allow said cores to be centered with an axis of a manipulator shaft, said travel means including a slide for holding said tray, said slide being provided with rotatable sheaves supported on said tracks for longitudinal movement of said slide in a first horizontal direction, a deck positioned on said vertical guides and supporting said slide in an operative position and being detachable from said slide in an inoperative position, a first hydraulic cylinder for a vertical displacement of said deck to vertically displace said slide with said tray towards a core blowing area, and a second hydraulic cylinder positioned horizontally on and across said slide to displace the tray in a second horizontal direction orthogonally of said first horizontal direction, said clipping system including a clipping means for cores collected on the tray to eliminate burrs on edges of the cores.

5,159,868

KNIFE CYLINDER FOR PROCESSING WEBLIKE MATERIAL

Hermann Thomas, Darmstadt, and Josef Herd, Munster, both of Fed. Rep. of Germany, assignors to Maschinenfabrik Goebel GmbH, Darmstadt, Fed. Rep. of Germany

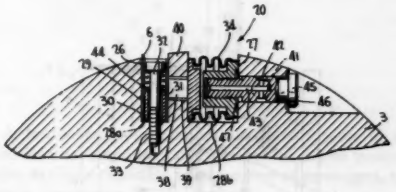
PCT No. PCT/DE90/00760, § 371 Date May 29, 1991, § 102(e) Date May 29, 1991, PCT Pub. No. WO91/05641, PCT Pub. Date May 2, 1991

PCT Filed Oct. 8, 1990, Ser. No. 689,823

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1989, 3934525

Int. Cl.[5] B26D *7/26*

U.S. Cl. 83—674 **4 Claims**



1. A knife cylinder for processing a continuous web, said cylinder being mounted on a frame for rotation about its axis of rotation, and comprising:

a cylindrical surface portion having at least one open slot formed therin for receiving and positioning a knife substantially parallel to said axis of rotation;

a plurality of pressure medium cylinders distributed over the length of said knife for pressing said knife against said knife cylinder, said pressure medium cylinders being located within said slot and each comprising metallic bellows cylinders;

conduit means mounted on said knife cylinder for rotation together therewith and being connected to said pressure medium cylinders for transmitting pressure medium thereto for axially extending said pressure medium cylinders in a direction perpendicular to said knife;

a plurality of shims located within said slot bearing against said knife and being respectively associated with said pressure medium cylinders;

said knife cylinder having a stationary wall lying parallel to said knife and being located within said slot between said shims and said pressure medium cylinders for limiting the axial extent of said pressure cylinders, said wall having through openings therein respectively aligned with said pressure medium cylinders, push rods located in said openings and extending at least between opposite sides of said stationary wall, said push rods transferring pressure from said pressure cylinders to said shims and to said knife for retaining said knife in place within said slot.

5,159,869

CUTTING STATION FOR A PANEL CUTTING MACHINE

Renzo Tagliaferri, Piacenza, Italy, assignor to Selco S.r.l., Crespellano, Italy

Filed Oct. 17, 1990, Ser. No. 599,053

Claims priority, application Italy, Oct. 18, 1989, 4926/89[U]

Int. Cl.[5] B27B *5/20*

U.S. Cl. 83—862 **4 Claims**

1. A cutting station for a panel cutting machine, comprising:

a) a bed comprising:

1) a first horizontal fixed beam;

2) a second horizontal fixed beam running parallel to the first horizontal fixed beam; and

3) a work surface supported by the beams;

b) a pair of horizontal slideways fixed to the first horizontal fixed beam, the horizontal slideways running parallel to each other and to the first horizontal fixed beam, each of the horizontal slideways defining a vertical plane and a space between the planes;

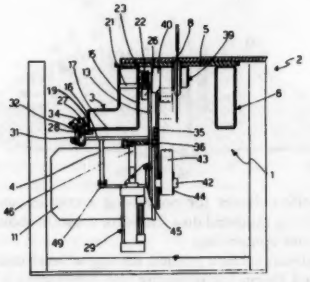
c) a carriage depending from and being supported and guided by the horizontal slideways and comprising:

1) a first cutting member;

2) first cutting member operating means for operating the first cutting member and having a center of gravity;

3) a first generally vertical slideway;

4) first cutting member vertical drive means for driving the first cutting member and its respective operating means along the first vertical slideway, the first cutting member vertical drive means having a center of gravity lying in the space between the vertical planes defined by the horizontal slideways;



5) a second cutting member;

6) second cutting member operating means for operating the second cutting member and having a center of gravity;

7) a second generally vertical slideway independent of the first vertical slideway; and

8) second cutting member vertical drive means for driving the second cutting member and its respective operating means along the second vertical slideway, the second cutting member vertical drive means having a center of gravity lying in the space between the vertical planes defined by the horizontal slideways;

d) carriage drive means mountable on the carriage for driving the carriage along the horizontal slideways; and

e) the center of gravity of the first and second cutting member operating means lying in the space between the vertical planes defined by the horizontal slideways to maximize the stability of the carriage.

5,159,870

PORTABLE ELECTRIC CUTTING AND SCORING SAW

Paul E. Fiala, 7205 Shadyoak Dr., Downey, Calif. 90240

Filed Aug. 15, 1991, Ser. No. 745,412

Int. Cl.[5] B27B *9/00*

U.S. Cl. 83—863 **18 Claims**

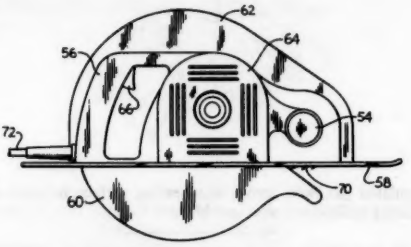
1. A method of cutting a workpiece having a laminate or veneer on the top side or on the top and bottom side with a portable electric cutting and scoring saw comprising:

providing a housing to contain a high speed electric motor, a set of gears, bearings, a cutting saw shaft, a scoring saw shaft and an idler shaft;

providing a cutting saw blade and a scoring saw blade to said cutting saw shaft and said scoring saw shaft, respectively, said blades lying in the same plane, said scoring saw blade disposed in front of the cutting saw blade, said cutting saw blade depth is a minimum of $\frac{3}{4}$ inches and a minimum of $1\frac{3}{4}$ inches, said cutting saw blade depth being changed by changing the diameter of said cutting saw blade, said scoring saw blade depth is $\frac{1}{4}$ inches, said scoring saw blade is approximately 0.002 inches wider on each side of two planes formed by the cutting saw blade width;

turning the cutting saw and scoring saw shafts by said high speed electric motor;

gearing the electric motor to said cutting and scoring saw shafts using said set of gears to directly drive said cutting saw blade and said scoring saw blade such that the cutting saw blades and scoring saw blades turn in opposite direction at least 5,000 R.P.M.;



providing a rear handle having an on and off spring biased trigger switch to turn on and off said electric motor, said rear handle also used to push said portable electric cutting and scoring saw across said workpiece;

providing a front handle to guide the cutting and scoring saw whereby turning on said electric motor, pushing on said rear handle and guiding said portable cutting and scoring saw by said front handle allows a smooth cut to be made on said workpiece.

5,159,871

CYLINDER-PISTON UNIT HAVING CENTRAL VALVE, IN PARTICULAR FOR VEHICLE BRAKE SYSTEMS

Georg Kehl, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

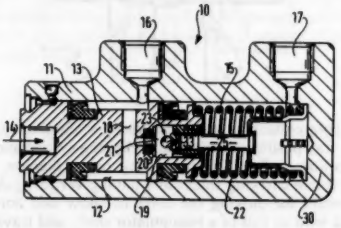
PCT No. PCT/DE90/00136, § 371 Date Sep. 25, 1991, § 102(e) Date Sep. 25, 1991, PCT Pub. No. WO90/11919, PCT Pub. Date Oct. 18, 1990

PCT Filed Feb. 27, 1990, Ser. No. 752,550

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1989, 3911911

Int. Cl.[5] F15B *11/08*

U.S. Cl. 91—422 **3 Claims**



1. A cylinder piston, with a central valve for a vehicle brake system comprising:

a cylinder (**11**), which is closed on one end and open on one end,

a movable piston (**13**) disposed in said open end,

a valve seat (**20**) on said piston,

said central valve including first and second spring plates (**29, 31**), a restoring spring (**15**) between said first and second spring plates, a valve shaft (**25**) that extends axially through said first and second spring plates, said valve shaft

including an enlarged end portion (26) which seats on said first spring plate and a smaller end portion that includes a cylindrical groove (34) therein,

a sleeve (36) that surrounds said smaller end portion and positioned on the piston side of said second spring plate for a longitudinal displacement relative thereto,

said sleeve (36) includes an enlarged inner bore end, and a smaller diameter outer end,

a spring (40) surrounding said smaller diameter end of said sleeve between said second spring plate and an enlarged snap ring (35) in said groove (34) of said valve shaft,

said snap ring (35) surrounds said valve shaft end and fits within said larger diameter bore of said sleeve to secure said central valve together,

a valve closing element on an end of said valve shaft toward said piston, and

said piston engages said second spring plate in an open non-braking position and additionally engages said valve ball during a braking operation.

5,159,872

VALVE UNITS FOR USE IN HYDRAULIC CONTROL SYSTEMS OF MINING EQUIPMENT

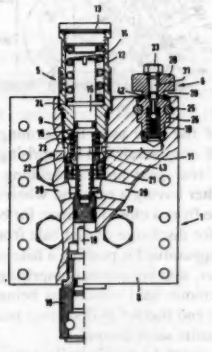
Michael Dettmers, Kamen, and Bernd Peters, Dülmen, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia GmbH, Fed. Rep. of Germany

Filed Apr. 10, 1991, Ser. No. 682,986

Claims priority, application Fed. Rep. of Germany, Apr. 19, 1990, 4012481

Int. Cl.[5] F15B *11/08, 13/04*

U.S. Cl. 91—432 **14 Claims**



1. In or for an hydraulic system for a mine working comprising an hydraulic appliance with a working chamber and pressure fluid feed and return lines connectible to the chamber; a valve unit comprising a non-return valve with an inlet connectible to the pressure fluid feed or return lines, an outlet connectible to the working chamber, hydraulic means for opening the non-return valve to establish connection between the inlet and the outlet, an auxiliary relief valve connectible to the outlet of the non-return valve and manual means for operating the auxiliary valve to relieve the pressure in the working chamber even when the non-return valve is closed;

wherein the non-return valve and the auxiliary relief valve have housings which are detachably mounted into bores in a common block; and

the housing of the relief valve has a plurality of drainage bores which open from a region of the housing leading to the outside of the block to allow the escape of relieved pressure fluid.

5,159,873

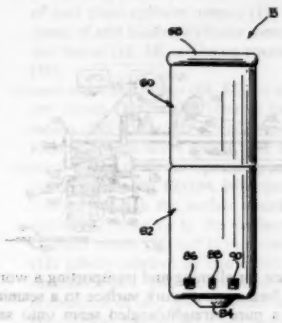
HOT BEVERAGE PRODUCING DEVICE

Kim Weeden, 9441 Crenshaw Blvd., Inglewood, Calif. 90305

Filed Feb. 25, 1991, Ser. No. 659,893

Int. Cl.[5] A47J *31/00*

U.S. Cl. 99—279 **4 Claims**



1. A hot beverage preparation apparatus for use in and located into the passenger compartments of engine powered vehicles having a relatively small number of passengers, said apparatus comprising:

a) an outer housing having a lower end thereof,

b) a first liquid retaining compartment or holding a liquid such as water,

c) a second liquid retaining compartment located in vertically spaced relationship with and beneath said first compartment of retaining a hot liquid therein,

d) a filter housing associated with one of said compartments so that a liquid can drain through a beverage producing substance in a filter disposed in said filter housing to form a liquid beverage,

e) an electrically operable heating element associated with one of said compartments for heating the liquid therein to a temperature sufficient to form a beverage, said heating element being operable from the electrical power provided by the electrical system of the vehicle,

f) a first electrically operable valve means in said outer housing and which is operable for permitting discharge of a liquid from the first liquid retaining compartment to the second liquid retaining compartment,

g) a second electrically operable valve means in said housing and which is operable for permitting discharge of a liquid beverage from the second liquid retaining compartment outwardly with apparatus for collection in a beverage cup,

h) first manually actuable switch means for controlling the heating element, said heating element being operable from the electrical power provided by the electrical system of the vehicle,

i) second manually actuable switch means for operating said second valve means and enabling discharge of the liquid beverage in the second liquid retaining compartment,

j) third manually actuable switch means for operating said first valve means or enabling discharge of the liquid in the first liquid retaining compartment to the second liquid retaining compartment, and

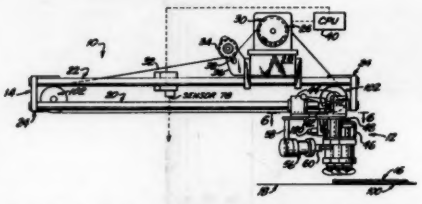
k) supporting means for supporting the outer housing of the apparatus in the engine powered vehicle in a position where a beverage cup can be located beneath the apparatus for receiving a hot beverage from the lower end of the apparatus, and here the manually actuable heating element control means and the valve means can be actuated by a single hand of a user of the apparatus.

5,159,874

ALIGNING DEVICE FOR SLEEVE

Maximilian Adamski, Jr., Palatine; Stephen Ruderman, Oak Park, and Robert G. Tegel, Huntley, all of Ill., assignors to Union Special Corporation, Huntley, Ill.

Filed Sep. 6, 1990, Ser. No. 578,767
Int. Cl.[5] D05B *1/02, 21/00, 27/04*
U.S. Cl. 112—262.3 **14 Claims**



1. An aligning device for aligning and transporting a workpiece along a line of feed upon a work surface to a seaming machine for sewing a pure straight/angled seam onto said workpiece, comprising:

a central processing unit (CPU) for coordinating operation of said aligning device;

a transport assembly for transporting said workpiece along said line of feed from a pickup point to a seaming point on said worksurface, said transport assembly comprising a plurality of gripping assemblies mounted onto a pivot assembly for rotating said workpiece during transport of said workpiece along said line of feed for subsequent processing at said seaming point;

a support assembly elevated above said worksurface for supporting said transport assembly along said line of feed;

a sensor located upon said worksurface for detecting a leading edge of said workpiece prior to said seaming point, said sensor cooperating with said CPU so that said sewing of said seam will commence at said leading edge; and

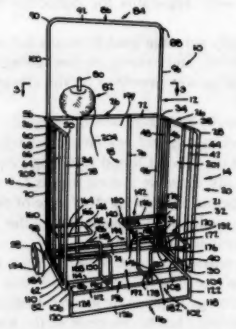
a motor for actuating motion of said transport assembly along said line of feed.

5,159,875

NEWSPAPER CART FOR STACKING, TYING AND UNLOADING OF NEWSPAPERS

Barry Cohen, P.O. Box 357, Millwood, N.Y. 10546

Filed Aug. 8, 1991, Ser. No. 742,631
Int. Cl.[5] B65B *13/18*
U.S. Cl. 100—34 **19 Claims**



1. A stacking cart for newspapers comprising,

a) a frame having a base defining a support for supporting newspapers thereon, oppositely disposed side walls extending from said base, a rear wall joining said side walls, a front portion opposite said rear wall and being entirely open above said support from one side wall to the other side wall, said opening extending unobstructed from said support to permit unloading of newspapers disposed on said support through said front portion.

b) a lateral channel and a longitudinal channel being formed in said base and being open at said support, said lateral channel extending through the opposite side walls and having opposite lateral end openings at respective said side walls, said longitudinal channel criss-crossing said lateral channel and extending from said front portion through said rear wall, and having on longitudinal end opening at said front portion and an opposite longitudinal end opening at said rear wall, and

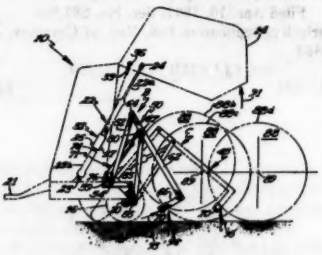
c) wheel means on said frame for permitting wheeled movement of said cart.

5,159,876

BALE DISCHARGING PUSHER FOR BALING MACHINES

Ray L. Olin, Box 35, New Salem, N. Dak. 58563

Filed Mar. 29, 1991, Ser. No. 677,347
Int. Cl.[5] B30B *5/04, 9/00;* A01D *39/00*
U.S. Cl. 100—88 **24 Claims**



1. In a baler of the type used for forming a substantially cylindrical bale of crop stock and comprising a body having side walls and a rear gate portion defining a bale-forming chamber and further having a rear end wherein said rear gate portion is movable from a closed position for bale formation to an open position for discharge of said bale from said chamber, a bale discharge apparatus for pushing a bale rearwardly away from the said baler, said apparatus comprising:

a pair of stanchions, said stanchions being pivotally connected at one end thereof at first pivot points to said baler body on opposite sides thereof;

a pair of booms, each boom pivotally connected at one end thereof to the other end of one of said stanchions at a second pivot point to provide on opposite sides of said baler body a pair of swingable legs having a knee joint defined by said second pivot points;

a bale-engaging cross member supported from the other ends of said booms and extending therebetween, said swingable legs being movable between a retracted, collapsed position when a bale is being formed and an extended position projecting rearwardly behind the baler after a bale has been discharged, said cross member being positioned adjacent said rear end of said baler under said rear gate portion in said retracted position of said swingable legs and engaging the bale as said legs are moved from said retracted to said extended position so as to push the bale rearwardly of said baler; and

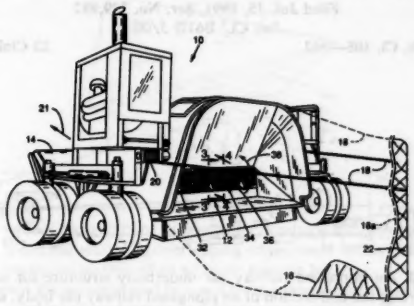
operating means connected to said swingable legs, said operating means being operable to move said swingable legs between said retracted and said extended positions.

5,159,877

ROTOR ARRANGEMENT FOR A BAGGING MACHINE

Larry Inman, Warrenton, and Mike Koskela, Astoria, both of Oreg., assignors to Ag-Bag Corporation, Warrenton, Oreg.

Filed Dec. 10, 1991, Ser. No. 804,607
Int. Cl.[5] B65B *3/04*
U.S. Cl. 100—144 18 Claims



1. A rotor arrangement for compaction apparatus, the rotor arrangement comprising:

a mounting member mounted upon the compaction apparatus for rotation about an axis of rotation; and

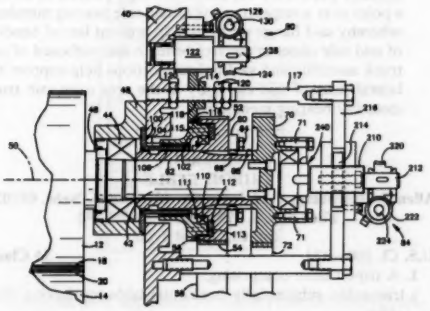
a plurality of teeth distributed upon the surface of the mounting member, the organization of tooth distribution being by tooth groups, the groups being angularly offset relative to one another about said axis of rotation, the tooth members of each group being angularly offset relative to one another.

5,159,878

SYSTEM FOR MOVING A PLATE CYLINDER RELATIVE TO A BLANKET CYLINDER

Michael E. Donelan, Portsmouth, and Joel C. Hern, Rollinsford, both of N.H., assignors to Heidelberg Harris, Inc., Dover, N.H.

Filed Mar. 30, 1992, Ser. No. 860,144
Int. Cl.[5] B41F *7/04, 13/14*
U.S. Cl. 101—217 4 Claims



1. An apparatus (10) for printing an inked image on sheet material (30), said apparatus (10) comprising:

a rotatable plate cylinder means (12) for carrying a printing plate (18) which defines the inked image;

a rotatable blanket cylinder means (14) for carrying a printing blanket (20);

frame means (40) for supporting said plate cylinder means (12) and said blanket cylinder means (14) in positions for a printing blanket (20) on said blanket cylinder means (14) to transfer the inked image from a printing plate (18) on said plate cylinder means (12) to the sheet material (30) when said plate cylinder means (12) and said blanket cylinder means (14) are rotating;

drive means (26) for rotating said plate cylinder means (12) and said blanket cylinder means (14) to transfer the inked image to the sheet material (30) in a printing operation;

first adjusting means (80, 82) for changing the surface speed of said plate cylinder means (12) relative to the surface speed of said blanket cylinder means (14) when said cylinder means (12, 14) are being rotated by said drive means (26);

second adjusting means (80, 82) for moving said plate cylinder means (12) axially relative to said blanket cylinder means (14) when said cylinder means (12, 14) are being rotated by said drive means (26); and

control means (300) for operating said first and second adjusting means (80, 82) (84, 86) simultaneously and continuously to change the surface speed of said plate cylinder means (12) relative to the surface speed of said blanket cylinder means (14) and to move said plate cylinder means (12) axially relative to said blanket cylinder means (14) simultaneously and continuously throughout repeated revolutions of said plate cylinder mean (12) and said blanket cylinder means (14) when said cylinder means (12, 14) are being rotated by said drive means (26) in a printing operation.

5,159,879

PLATE SURFACE CORRECTING SOLUTION FOR DRY LITHOGRAPHIC PRINTING PLATE

Yoshihiko Urabe, Haibara, and Toshio Ohba, Annaka, both of Japan, assignors to Fuji Photo Film Co., Ltd., Tokyo and Shin-Etsu Chemical Co., Ltd., Gunma, both of, Japan

Filed Oct. 23, 1991, Ser. No. 782,972
Claims priority, application Japan, Oct. 26, 1990, 2-289489
Int. Cl.[5] B41C *1/10;* B32B *35/00*
U.S. Cl. 101—465 5 Claims

1. A process of correcting a dry lithographic printing plate which comprises applying to an unwanted area of an ink-accepting area in the dry lithographic printing plate consisting of ink-repellent areas comprising a silicone rubber layer and ink-accepting areas, a correcting solution comprising the following components:

		amount (parts by weight)
(a)	Linear organopolysiloxane having three alkoxy groups at both terminal ends	100
(b)	Titanium based condensation catalyst	0.1 to 5
(c)	Organic solvent	100 to 5,000

5,159,880

CABLE TRANSPORT INSTALLATION WITH CARS DRIVEN BY FRICTION

Jean-Francois Mugnier, Fontaine, France, assignor to Pomagalski S.A., Fontaine, France

Filed Dec. 21, 1990, Ser. No. 631,861
Claims priority, application France, Nov. 15, 1990, 90 14677
Int. Cl.[5] B61B *13/00*
U.S. Cl. 104—87 7 Claims

1. A transfer track for frictionally driving cars therealong, comprising:

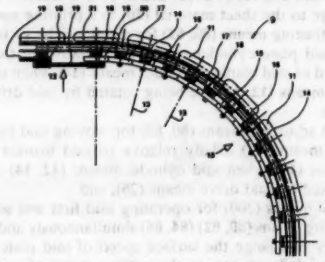
tired wheels disposed along said transfer track for frictionally driving said cars, each of said tired wheels having a respective rotation axis;

a cog-wheel transmission for driving said tired wheels disposed along said transfer track, said cog-wheel transmission comprising:

a) a plurality of toothed drive pinions, at least one of said

toothed drive pinions being disposed on the rotation axis of each tired wheel; and

b) a plurality of toothed inverter pinions, at least one of said toothed inverter pinions being disposed between



adjacent toothed drive pinions for transmitting rotation to said toothed drive pinions, wherein said toothed drive pinions and said toothed inverter pinions are conical.

5,159,881

METHOD AND SYSTEM FOR DAMPING THE OSCILLATORY MOTIONS OF RAILWAY VEHICLES

Charles R. Durand, and Jérôme C. Durand, both of Château de Lingourdy, Le Bodio, Corlay, France 22320

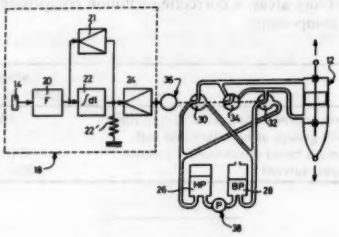
PCT No. PCT/FR89/00266, § 371 Date Dec. 20, 1990, § 102(e) Date Dec. 20, 1990, PCT Pub. No. WO89/11991, PCT Pub. Date Dec. 14, 1989

PCT Filed May 31, 1989, Ser. No. 613,646

Claims priority, application France, Jun. 3, 1988, 88 07418

Int. Cl.[5] B61B *12/00*

U.S. Cl. 105—199.2 **15 Claims**



5. In a damping system for damping motions of bodies and axles of railway vehicles by a damping system including an accelerometer for emitting signals responsive to directions of motion to be damped, a circuit for processing said accelerometer signals and emitting processing signals, at least one hydraulic double-acting cylinder means interposed between one of said bodies and one of said axles, and a piston slidingly mounted in said cylinder means and providing two chambers on opposite sides of said piston, the improvement comprising:

a reservoir means for oil under pressure;

means for selectively communicating said oil in said reservoir with one of said chambers of said cylinder means in response to processing signals from said processing circuit; and

means for automatically regenerating at least a part of the pressure in said reservoir means by relative motion between said one body and said one axle.

5,159,882

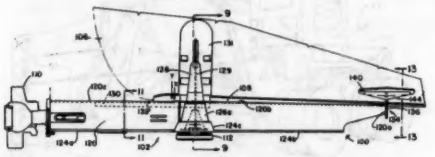
RAILWAY CAR UNDERBODY STRUCTURE AND METHOD

John A. Krug, St. Charles County; William L. Willis, Franklin County; Paul J. Dumser, St. Charles County; William U. Casseau, St. Louis County; William T. Deet, Franklin County; Laurence E. Culligan, St. Charles County, all of Mo., and Bruce A. Walter, Madison, Ill., assignors to ACF Industries, Inc., Earth City, Mo.

Filed Jul. 15, 1991, Ser. No. 729,992

Int. Cl.[5] B61D *5/00*

U.S. Cl. 105—362 **23 Claims**



2. An improved railway car underbody structure for supporting the end section of an elongated railway car body, said underbody structure having a center sill assembly beneath the longitudinal center line of said car body, said sill carrying a railway car coupler assembly on the outboard end thereof, said center sill assembly riding upon a wheeled railway truck assembly having an upper side bearing member on each lateral side thereof for bearing the load of said car body during lateral tilting of said car body, the improvement comprising;

said center sill assembly including two unitary upright side plates spaced equidistant from the longitudinal center line of said car body and extending longitudinally from said coupler assembly inboard to at least said truck assembly;

a pair of unitary combination center sill bottom flange and car body bottom bolster members welded to the bottom edge of each of a respective one of said side plates;

said unitary members each having a longitudinally extending horizontally disposed flange portion extending laterally outward from a respective side plate and extending longitudinally from above said truck assembly toward said coupler assembly and beyond the end of said car body; and

said unitary members each also including a bottom bolster portion in the area above said truck assembly extending laterally outwardly beyond said flange portion to at least a point over a respective one of said side bearing members, whereby said flange portions help prevent lateral bending of said side plates in the area beneath and outboard of said truck assembly and said bolster portions help support the lateral sides of said car body in the area over said truck assembly bearing members.

5,159,883

TRIPOD TABLE

Allen T. Rosenberg, 1114 Jones St., 12, Omaha, Nebr. 68102

Filed Sep. 3, 1991, Ser. No. 753,790

Int. Cl.[5] A47B *3/00*

U.S. Cl. 108—111 **14 Claims**

1. A tripod table comprising,

a triangular, substantially horizontal table top having three sides,

three table top support legs each attached to a different side of said table top,

each of said table top support legs comprising first, second and third substantially triangular sections,

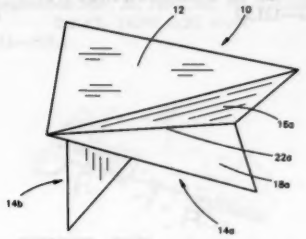
each of said first and second triangular sections foldably attached along common long sides,

said second and third triangular sections foldably attached along common hypotenuses,

said first triangular section of each of said table top support

legs attached to a different side of said table top along the hypotenuses of said first triangular sections,

said table top support legs being folded along said hypotenuses of said first triangular section, folded along said common long sides of said first and second triangular sections and folded along said common hypotenuses of



said second and third triangular sections to place each first triangular section in overlapping engagement with a third triangular section of an adjacent support leg,

means for securing said first and third triangular sections in overlapped engagement in folded support positions of said support legs whereby said table top support legs supported said table top in a substantially horizontal position.

5,159,884

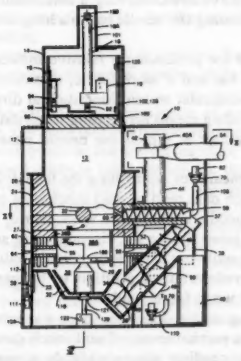
AUTOMATIC INCINERATOR APPARATUS

Franklin S. Malick, 518 Greenleaf Dr., Monroeville, Pa. 15146

Continuation-in-part of Ser. No. 546,925, Jul. 2, 1990, abandoned. This application Sep. 17, 1991, Ser. No. 760,995

Int. Cl.[5] F23G *5/02*

U.S. Cl. 110—223 **28 Claims**



1. An incinerator apparatus for waste material, said apparatus including a ram feed waste storage chamber in communication with an underlying combustion chamber, a bar having an ash abrading surface traversing the entrance to the combustion chamber while supporting waste material in the waste storage chamber under a compression force imposed by a ram, the ash abrading surface of said bar being operated to loosen and pass charred waste to an underlying combustion chamber, and means for controlling the abrading of charred waste by said bar into said combustion chamber.

5,159,885

PROCESS FOR INCINERATING SOLID WASTES AND A PROCESS FOR TREATING SOLID WASTES AND A PROCESS FOR TREATING GASES GENERATED THROUGH INCINERATION OF THESE WASTES

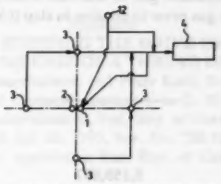
Nobuyasu Hasebe, and Nobukatsu Hasebe, both of No. 142, 2-chome, Nishiogikita, Suginamiku, Tokyo, Japan

Filed Jan. 24, 1991, Ser. No. 645,262

Claims priority, application Japan, Jun. 27, 1990, 2-170699

Int. Cl.[5] F23G *5/00*

U.S. Cl. 110—346 **7 Claims**



1. A process for the incineration of combustible wastes in land fills and the like, characterized in that

a. the energy of an explosive is used to initiate the combustion of the said burnable wastes and to simultaneously for at least one combustion chamber for primary combustion;

b. supplying a fuel and an oxidizing gas into said chamber to maintain combustion; and

c. conducting gases generated through incineration to the surface for subsequent treatment to remove environmentally harmful and toxic substances.

5,159,886

PROCESS OF COMBUSTING COAL IN A CIRCULATING FLUIDIZED BED

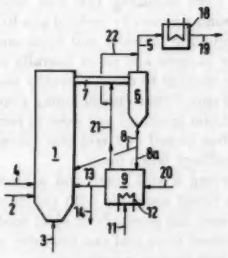
Georg Schaub; Gebhard Bandel, both of Frankfurt am Main; Rainer Reimert, Idstein-Kröftel, and Hans Beisswenger, Bad Soden, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 28, 1992, Ser. No. 827,011

Claims priority, application Fed. Rep. of Germany, Feb. 1, 1991, 4102959

Int. Cl.[5] F23D *1/00*

U.S. Cl. 110—347 **7 Claims**



1. A process for combusting granular coal, comprising the steps of:

(a) burning granular coal in a circulating fluidized bed system by:

(a_1) feeding granular coal to a fluidized bed to which an oxygen-containing gas is supplied and buring the granular coal of the fluidized bed,

(a_2) continuously entraining from said fluidized bed a mixture of particles and an oxygen-containing combus-

tion gas produced in said bed by the burning of the granular coal,

(a_3) continuously separating said particles from said combustion gas, and

(a_4) continuously recirculating particles separated in step (a_3) to said fluidized bed;

(b) cooling said combustion gas;

(c) carbonizing granular coal to produce a carbonization gas containing combustible components; and

(d) introducing said carbonization gas into said oxygen-containing combustion gas and buring said carbonization gas in said combustion gas to increase a temperature of said combustion gas prior to cooling in step (b) to about 850° to 1200° C.

5,159,887

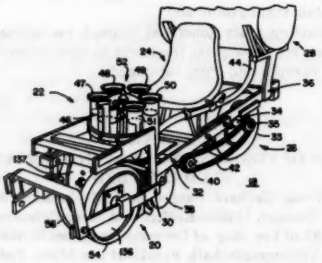
PLANT TRANSPLANTER

Howard B. Poll, 707 Aster Ave., Holland, Mich. 49423

Filed Nov. 13, 1990, Ser. No. 613,227

Int. Cl.[5] A01C *11/02*

U.S. Cl. 111—109 **23 Claims**



1. A plant transplanter for mechanically planting seedlings comprising:

a furrow opening shoe for forming a furrow;

a cup assembly comprising a plurality of cups for receiving, holding and dispensing seedlings, said cups sequentially dispensing seedlings to be planted in said furrow;

each of said cups including first and second cup halves pivoted around a generally vertical axis to open and close, said cups pivoting laterally and horizontally away from one another to open and pivot laterally and horizontally toward one another to close; whereby said cup halves of each of said cups form a cup including a bottom to support the roots of said seedlings and sides to receive and hold a seedling when closed and said cup halves are spaced to dispense seedlings when open;

an ejector having a kick plate and a chute which move together in timed sequence with the dispensing of seedlings from said cup assembly to eject seedlings dispensed by and received from said cup assembly into said furrow formed by said furrow opening shoe;

said chute of said ejector includes a top portion providing a funnel for receiving the seedlings, said chute having a cut-a-way portion extending downwardly from said top portion and into said shoe and merging with said kick plate; and

said chute and kick plate being movable in and out of said shoe in substantially the same timed sequence as the timed sequence of the dispensing of the seedlings by said cup assembly.

5,159,888

AUTOMATIC SEWING MACHINE CAPABLE OF FAST JUMP STITCHING

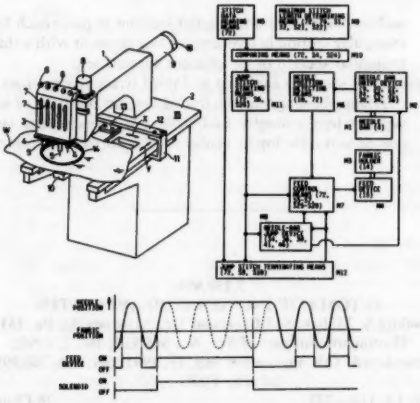
Tetsuo Morita, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Apr. 10, 1992, Ser. No. 866,361

Claims priority, application Japan, Apr. 24, 1991, 3-122036

Int. Cl.[5] D05B *21/00*; D05C *5/04*

U.S. Cl. 112—121.12 **14 Claims**



1. An automatic sewing machine comprising:

a needle bar carrying a needle;

a needle-bar drive device having a needle-bar drive source, for reciprocating the needle bar in a longitudinal direction thereof;

a feed device for producing a relative movement between the needle bar and a work fabric, in a direction substantially perpendicular to said longitudinal direction;

stitch data reading means for reading stitch data indicative of needle positions at which the needle penetrates a work fabric;

feed control means for controlling the feed device according to said stitch data read by said stitch data reading means, when the needle is above the work fabric;

a needle-bar jump device for disconnecting said needle bar from said needle-bar drive source, and holding said needle bar at a predetermined position to maintain the needle above said work fabric; and

jump stitching means operable, when a stitch length represented by a particular set of said stitch data read by said stitch data reading means exceeds a maximum stitch length, for executing a jump stitching operation which includes placing said feed control means in an inoperative state, placing said needle-bar jump device and said feed device in operated states to produce a continuous relative movement between said needle bar and said work fabric, and restoring said feed control means and said needle-bar jump device to an operative state and a non-operated state, respectively, when a needle position represented by said particular set of stitch data is reached by said continuous relative movement.

5,159,889

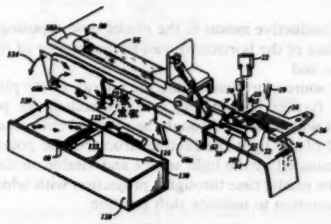
SEWING MACHINE WITH AUTOMATIC LATCH BACK DEVICE AND METHOD OF SEWING A PORTION OF A THREAD CHAIN

Elvin C. Price, Dacula, and Preston B. Dasher, Lawrenceville, both of Ga., assignors to Atlanta Attachment Company, Lawrenceville, Ga.

Continuation-in-part of Ser. No. 630,841, Dec. 20, 1990. This application Mar. 25, 1991, Ser. No. 674,389

Int. Cl.[5] D05B *1/20, 65/00*

U.S. Cl. 112—269.1 28 Claims



23. A method of sewing a portion of a thread chain, extending from the sewing needles of a sewing machine to a previously sewn work piece, to a second work piece to eliminate any significant knot or thread chain at the leading edge of the second work piece, said method comprising the steps of:

moving a first work piece along a sewing path of the sewing machine;

forming an overlock stitch about a hollow chaining tongue with the sewing needles of the sewing machine in the first work piece as the first work piece moves through the sewing path and sewing off the first work piece to form a thread chain extending from the first work piece to the sewing needles;

sensing the completion of sewing of the first work piece which has moved along the sewing path of the sewing machine;

in response to sensing the completion of sewing the first work piece, drawing taut the thread chain extending from the first work piece to the sewing needles;

while the thread chain is taut, cutting the thread chain extending between the needles of the sewing machine and the first work piece in response to sensing the completion of sewing of the first work piece in a manner to create a leading thread chain of a predetermined length extending from the sewing needles that recoils toward the hollow chaining tongue;

drawing off the free end of the leading thread chain extending from the sewing machine needles into the hollow chaining tongue in such a manner as to cause the excess thread chain to extend below the sewing path of the sewing machine;

continuing to form an overlock stitch with the needles of the sewing machine about the chaining tongue as the thread chain is drawn into the hollow chaining tongue,

advancing the second work piece along the sewing path toward the sewing machine needles while the leading thread chain is drawn into the hollow chaining tongue until the second work piece is engaged in the sewing needles;

simultaneously forming an overlock stitch in the second work piece and progressively oversewing the drawn off leading thread chain in the overlock stitch.

5,159,890

DEVICE FOR STOPPING THE DRIVE OF A SEWING MACHINE IN THE CASE OF A THREAD DISTURBANCE

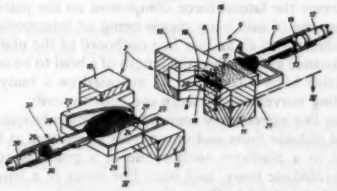
Kurt Arnold, Kaiserslautern, and Peter Liell, Stelzenberg, both of Fed. Rep. of Germany, assignors to G. M. Pfaff Atkiengesellschaft, Kaiserslautern, Fed. Rep. of Germany

Filed Jul. 30, 1991, Ser. No. 738,186

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1990, 4024846

Int. Cl.[5] D05B *69/36*

U.S. Cl. 112—278 10 Claims



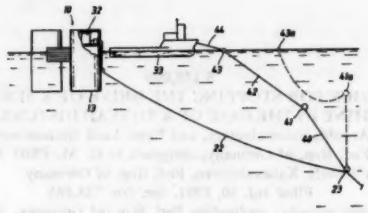
1. A sewing machine thread monitoring device, comprising: a light source; first light guide means for transmitting light beams to a monitoring point including a radiation outlet in a plane perpendicular to a direction of thread pull off for providing light beam over a maximum range of movement of a sewing machine thread with substantially equal radiation intensity over a radiation cross section; second light guide means connected to a receiver and including a radiation inlet for receiving light beams passing through said maximum range of movement of the thread perpendicular to the pull-off direction after being emitted from said radiation outlet; and, control means connected to said receiver for generating a signal in response to a change in intensity of a radiation signal entering said radiation inlet, said change in intensity representing an absence of thread in a zone of said monitoring point, said first and second light guide means each include a plurality of light guide fibers, each of said light guide fibers having ends, said ends of said first light guide means forming said radiation outlet and said ends of said second light means forming said radiation inlet, said ends of said light guide fibers being arranged substantially in parallel and spaced substantially in equal distance from one another, said ends of said light guide fibers being imbedded between two cover plates of a multi-layer needle plate, said ends terminating in a zone at an edge of a stitch hole formed in said needle plate.

5,159,891

ADJUSTABLE BOAT MOORING SYSTEM FOR A FLEXIBLY-SUPPORTED TENSION LEG PLATFORM

Curtis J. Lohr, Mandeville, La., and David A. Huete, Spring, Tex., assignors to Shell Offshore Inc., Houston, Tex.

Filed Aug. 22, 1991, Ser. No. 748,402
Int. Cl.[5] B63B *22/02, 21/50*
U.S. Cl. 114—230 **9 Claims**



1. A tension leg platform and a boat mooring system, comprising:

a floating platform having secured thereto a plurality of substantially vertical flexible tendons the lower ends of which are anchored to the ocean floor at spaced-apart points outside a defined well drilling area, said tendons extending to the ocean surface to be held in tension by the buoyant platform in a manner such that the center of the platform is moored substantially over the center of the well drilling area;

a plurality of lateral platform-mooring anchor lines secured to the lower part of the platform at at least a plurality of spaced-apart compass points thereof and extending to ocean floor anchors a distance from the platform;

buoy means secured to said anchor lines outboard of said platform to form multiple catenaries in each anchor line to increase the lateral force component on the platform;

at least one of said buoy means being an intermediate buoy positioned on an anchor line outboard of the platform for a distance greater than the length of a boat to be anchored;

a slidable buoy adapted to be mounted on a buoy line for sliding movement between the ends thereof;

a buoy line operatively secured in sliding relationship with said slidable buoy and operatively connected at the other end to a platform anchor line at a point adjacent said intermediate buoy, said buoy line being of a length sufficient to extend to the ocean surface; and

connector means on the other end of said buoy line and outside said sliding buoy for connecting thereto the end of a bow hawser from a boat.

5,159,892

SHIFT POSITION INDICATING DEVICE FOR AUTOMATIC TRANSMISSION

Toshiyuki Hara, Yokohama, and Katsunori Shirahama, Atsugi, both of Japan, assignors to Ohi Seisakusho Co., Ltd. and Nissan Motor Co., Ltd., both of Yokohama, Japan

Continuation of Ser. No. 420,034, Oct. 11, 1989, abandoned. This application Jul. 10, 1991, Ser. No. 729,779
Claims priority, application Japan, Oct. 11, 1988, 63-131830[U]
The portion of the term of this patent subsequent to Feb. 12, 2008, has been disclaimed.
Int. Cl.[5] G01D *13/04;* **G09F** *9/00*
U.S. Cl. 116—28.1 **18 Claims**

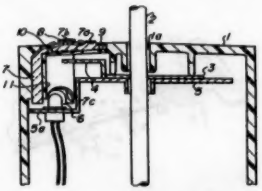
1. A gear shift position indicating device for use with a shift lever, comprising:

an opaque plastic case;

a light conductive structure having a horizontal wall and a vertical wall, the walls being integral with each other;

first and second groups of projections integrally formed in the horizontal wall, one of said group of projections having indicia representative of gear shift position, a rounded cut formed in the lower edge of the vertical wall, the light conductive structure being embedded in the plastic case by means of monobloc molding, the first and second groups of projections on the horizontal wall being exposed to the outside of the plastic case while the lower edge of the vertical wall is contained within the interior of the plastic case;

a pointer located within the plastic case below the horizontal wall of the light conductive structure, the pointer being movable with the shift lever;



light conductive means in the plastic case exposing a lower surface of the horizontal wall to the interior of the plastic case; and

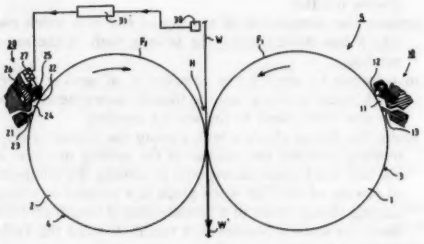
a light source for illuminating the interior of the plastic case and further illuminating said projections by providing light which passes through the rounded cut in the vertical wall of the light conductive structure, the pointer being illuminated by the light source and visable on the outside of the plastic case through a projection with which it is in registration to indicate shift position.

5,159,893

METHOD AND APPARATUS FOR REGULATION OF THE MOISTURE PROFILE OF A PAPER OR BOARD WEB IN A FILM SIZE PRESS

Rauno Rantanen, Muurame, Finland, assignor to Valmet Paper Machinery Inc., Finland

Filed Sep. 28, 1990, Ser. No. 590,481
Claims priority, application Finland, Oct. 9, 1989, 894790
Int. Cl.[5] B05C *1/00*
U.S. Cl. 118—227 **6 Claims**



1. A film of size press apparatus for a paper or board web comprising:

first and second film size press rolls arranges so as to define a press nip therebetween;

a first coating device for spreading a first film of size of substantially constant profile on said first press roll;

a second coating device which is adjustable for spreading a second size of film of variable profile onto said second press roll, said first film of size and said second film of size being transferred from said first press roll and said second press roll onto a web running through said press nip;

means for measuring the moisture profile of the web at a location in the path of the web before the web reaches said press nip; and

means for adjusting the variable profile of said second coating device in response to information received from said means for measuring the moisture profile of the web, such that the moisture profile of the web at said nip remains substantially invariable.

5,159,894

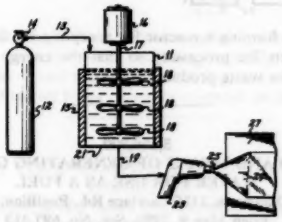
APPARATUS FOR FORMING A PERMANENT FOAM COATING BY ATOMIZATION ONTO A SUBSTRATE

Laurence B. Saidman, Westlake, and James C. Smith, Lorain,- both of Ohio, assignors to Nordson Corporation, Westlake, Ohio

Continuation of Ser. No. 572,439, Aug. 27, 1990, abandoned, which is a division of Ser. No. 389,671, Aug. 4, 1989, Pat. No. 4,983,424. This application Nov. 19, 1991, Ser. No. 794,790

Int. Cl.[5] B05C *5/02, 11/11*

U.S. Cl. 118—300 5 Claims



1. An apparatus for applying a permanent foam coating on a substrate comprising, in combination:

at least one rotatable shaft including a first series of spaced disks substantially perpendicular to the axis thereof and rotatable therewith about said axis,

a housing surrounding said shaft and disks,

said disks serving to divide said housing into a series of compartments along its length,

liquid coating material inlet means at one end of said housing,

liquid coating material/gas solution outlet means at the other end of said housing,

means for introducing a gas into said housing, and

means for driving said rotatable shaft to cause said disks to rotate to cause mixing of said gas with said coating material within said housing to form said coating material/gas solution upstream of said coating material/gas solution outlet means,

means for maintaining said gas in solution with said coating material in said apparatus housing, and

means for atomizing said coating material/gas solution to atmospheric pressure to form atomized particles for projection onto the substrate as a permanent foam coating.

5,159,895

PACKAGED ARTICLE ASSEMBLY

Robert W. Helling, 11214 Quivas Way, Westminster, Colo. 80234; Daniel J. Helling, 8288 Pecos St., Denver, Colo. 80221, and Dean V. Rogers, 9330 N. County Rd. 15, Fort Collins, Colo. 80524

Division of Ser. No. 550,099, Jul. 9, 1990, Pat. No. 5,035,104. This application Jul. 23, 1991, Ser. No. 734,474

Int. Cl.[5] A01K *63/02*; B65B *23/00, 55/20, 53/00*

U.S. Cl. 119—3 8 Claims

1. A packaged article assembly comprising:

an article,

a plurality of packaging particles forming a layer entirely surrounding said article, and

a flexible body surrounding said particles, said body being collapsed around said particles to apply substantially uniform compressive forces from all sides to compress said particles against said article and cause a frictional engagement of particles against said article and against one another to cushion said article within said body.

5,159,896

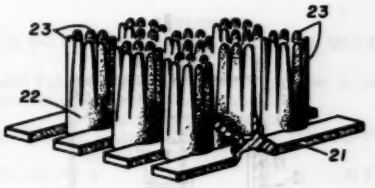
POULTRY NEST PAD

Anthony J. Mortillo, Chesterfield; Danny B. Cochran, Ballwin, and Anthony J. Micale, Jr., Chesterfield, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 18, 1992, Ser. No. 853,285

Int. Cl.[5] A01K *31/14*

U.S. Cl. 119—50.5 5 Claims



1. A gray poultry nest pad wherein said gray is defined as N3 through N9 on the Munsell Neutral Value Scale.

5,159,897

CONTINUOUS-FLOW STEAM GENERATOR

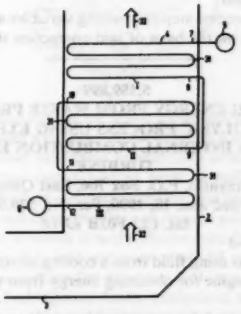
Joachim Franke, Altdorf; Volker Kefer, and Eberhard Wittchow, both of Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 606,035, Oct. 30, 1990, abandoned. This application Oct. 15, 1991, Ser. No. 782,869

Claims priority, application European Pat. Off., Oct. 30, 1989, 89120140.2

Int. Cl.[5] F22B *23/06*

U.S. Cl. 122—367.3 8 Claims



1. Continuous-flow steam generator, comprising a vertical gas flue for connection to an outlet conduit of an apparatus

emitting hot gas, an evaporator heating surface in said vertical gas flue having an inlet header, an outlet header and first and second heat exchanger sections connected between said inlet and outlet headers, each of said first and second heat exchanger sections having an upper section end and a lower section end, said upper section end of said first heat exchanger section communicating with and being directly connected to said upper section end of said second heat exchanger section, and said lower section ends of said first and second heat exchanger sections respectively communicating with said inlet and outlet headers.

5,159,898

PROCESS AND APPARATUS FOR UTILIZATION OF FUELS WITH ALCOHOL ADDITIVES FOR AN INTERNAL COMBUSTION ENGINE

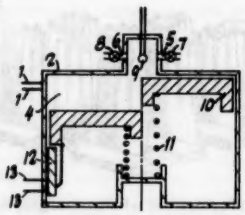
Gunter Hartel, Neuss; Armin Schurfeld, Meerbusch; Karl-Henrich Losing, Alpen; Dieter Thonnessen, Viersen, and Ulrich Remde, Meerbusch, all of Fed. Rep. of Germany, assignors to Pierburg GmbH, Neuss, Fed. Rep. of Germany

Filed Oct. 1, 1991, Ser. No. 771,367

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1990, 4031009

Int. Cl.[5] F02B *75/12*

U.S. Cl. 123—1 A **16 Claims**



1. A process for determining the presence of an alcohol additive in a fuel mixture for an internal combustion engine and for correcting engine operation based thereon, said process comprising;

in a first process step, heating a sample quantity of fuel to vaporize said sample quantity;

in a second process step, measuring properties of the vaporized sample quantity;

in a third process step, determining from the measured properties of the vaporized sample quantity the presence of alcohol in said sample quantity and its concentration based on the difference between the molecular weight of fuel along without alcohol and the molecular weight of alcohol, and producing a correction signal based on said difference; and

in a fourth process step controlling variables affecting engine operation on the basis of said correction signal.

5,159,899

OBTAINING ENERGY FROM WASTE PRODUCTS BY THE PYROLYSIC PROCESS USING EXHAUST GAS FROM AN INTERNAL COMBUSTION ENGINE OR TURBINE

Zbigniew Dobrzynski, P.O. Box 706, East Quogue, N.Y. 11942

Filed Jun. 18, 1990, Ser. No. 539,926

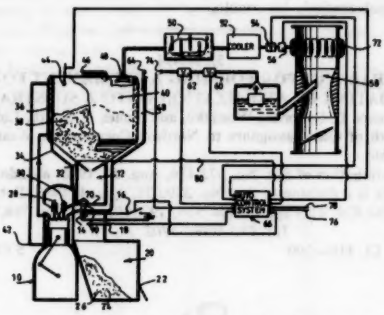
Int. Cl.[5] F02B *43/08*

U.S. Cl. 123—3 **7 Claims**

1. Apparatus using fluid from a cooling system of an internal combustion engine for obtaining energy from waste products, comprising:

a) an upper tank for receiving the waste products;

b) means forming a heating system for heating said upper tank by using the fluid from the cooling system of the internal combustion engine so that the waste products are heated; and



c) means forming a reactor for accepting the heated waste products for processing so that the energy is obtained from the waste products.

5,159,900

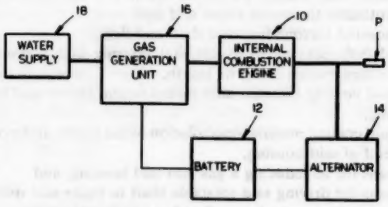
METHOD AND MEANS OF GENERATING GAS FROM WATER FOR USE AS A FUEL

Wilbur A. Dammann, 1115 Carriage Rd., Papillion, Nebr. 68046

Filed May 9, 1991, Ser. No. 697,413

Int. Cl.[5] F02B *43/08*

U.S. Cl. 123—3 **4 Claims**



1. A gas generation unit for providing gas for an internal combustion engine, comprising:

a reaction chamber having water therein,

a pair of spaced apart carbon electrodes in said reaction chamber immersed in the water therein,

means for supplying electrical current to said carbon electrodes to create an electrical arc therebetween whereby the carbon electrodes will burn and rapidly oxidize to from carbon monoxide and hydrogen.

5,159,901

STRUCTURE FOR MOUNTING A WATER PUMP ON AN ENGINE

Mitsugi Chonan, Ibaragi, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 20, 1992, Ser. No. 839,096

Claims priority, application Japan, Mar. 8, 1991, 3-68747

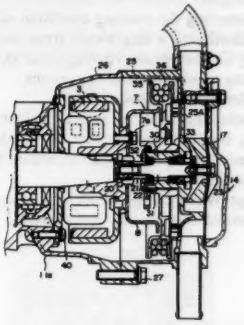
Int. Cl.[5] F01P *5/10*

U.S. Cl. 123—41.47 **3 Claims**

1. A structure for mounting a water pump on an engine having a crankshaft and a recoil starter, said water pump having an impeller shaft, an improvement of the structure which comprises:

a recoil starter housing secured to said engine;

a cylindrical boss formed on the recoil starter housing coaxially with the crankshaft;



said impeller shaft of said water pump being connected to an end of said crankshaft, and being rotatably mounted in said boss of said recoil starter housing; and

said recoil starter being rotatably mounted on said boss.

5,159,902

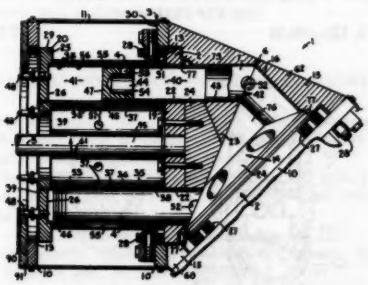
ROTARY VEE ENGINE WITH THROUGH-PISTON INDUCTION

C. Louis Grimm, 6042 Pflumm Rd., Shawnee, Kans. 66216

Filed Dec. 31, 1990, Ser. No. 635,999

Int. Cl.[5] F02B *57/06*

U.S. Cl. 123—43 A **26 Claims**



1. In an engine including a piston and a cylinder, the improvement comprising:

(a) said piston having an elongated tubular piston wall closed at one end by a piston head having a piston head face to define a fluid passage and having piston seal ring means encircling said piston head;

(b) said cylinder having an elongated inner cylinder surface closed at one end by a cylinder head surface to define a cylinder chamber, said cylinder receiving said piston therein with said ring means in sealing engagement with said cylinder surface;

(c) means causing cyclic relative motion between said piston and said cylinder during operation of said engine between a top-dead-center (TDC) position and a bottom-dead-center (BDC) position of said piston relative to said cylinder;

(d) a piston intake port formed through said piston wall in spaced relation to said piston head face on an opposite side of said ring means from said piston head face;

(e) cylinder intake groove means formed into said cylinder surface in spaced relation to said cylinder head surface;

(f) a cylinder exhaust port formed through said cylinder surface in spaced relation to said cylinder head surface and said groove means, said exhaust port being closed by said ring means being positioned between said exhaust port and said TDC position;

(g) means communicating a fuel/air charge to said piston fluid passage; and

(h) said relative motion being of such a configuration and said piston intake port, said groove means, and said exhaust port being mutually positioned such that said ring means opens said exhaust port upon said piston approaching said BDC position to exhaust an expended charge and said piston intake port aligning with said groove means thereby enabling and maintaining fluid communication between said fluid passage and said cylinder chamber through said intake port and said groove means subsequent to said BDC position and after said exhaust port has been closed to thereby admit a fresh fuel/air charge into said cylinder chamber.

5,159,903

AIR INTAKE SYSTEM FOR TWO CYCLE MULTI CYLINDER ENGINE

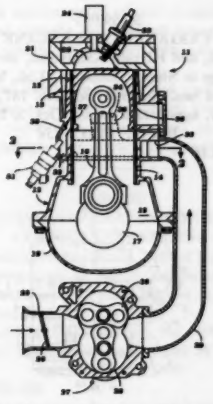
Masanori Takahashi, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Dec. 4, 1990, Ser. No. 624,890

Claims priority, application Japan, Dec. 6, 1989, 1-317319

Int. Cl.[5] F02B *75/02, 75/18*

U.S. Cl. 123—65 A **28 Claims**



1. An induction system for a two cycle internal combustion engine comprising a cylinder block defining a cylinder bore, a scavenge manifold extending substantially around said cylinder bore, at least two scavenge ports extending from said scavenge manifold at circumferentially spaced locations and terminating in said cylinder bore and opened and closed by the reciprocation of a piston in said cylinder bore for transferring a charge delivered to said scavenge manifold to said cylinder bore, and a fuel injector for injecting fuel into said scavenge manifold, said fuel injector being juxtaposed to one of said scavenge ports so that the fuel injected by said fuel injector enters said cylinder bore substantially solely through said one scavenge port.

5,159,904

DEVICE FOR ADJUSTING THE ANGULAR SETTING OF A DRIVEN SHAFT RELATIVE TO A DRIVING SHAFT

Alain F. C. Ingold, 8 rue Cernuschi, 75017 Paris, France

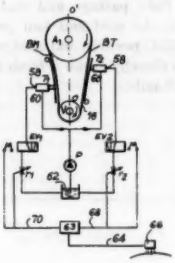
PCT No. PCT/FR89/00170, § 371 Date Dec. 11, 1989, § 102(e) Date Dec. 11, 1989

PCT Filed Apr. 14, 1989, Ser. No. 458,742

Claims priority, application France, Apr. 14, 1988, 88 04956

Int. Cl.[5] F01L *1/34*

U.S. Cl. 123—90.15 **11 Claims**



1. Device for driving at least one driven shaft (A1), by means of a driving shaft (V), comprising a closed-loop transmission connection of constant length defining a slack side (BM) on which a first tightener acts and at least one tight side (BT) on which a corresponding tightener (T2) acts, characterized in that the tighteners are hydraulic tighteners having a valve each comprising a chamber (42) continuously supplied with control fluid under pressure and provided with bleeder means controlled by a sequential control unit for varying the angular setting of the driven shaft relative to the driving shaft.

5,159,905

VARIABLE CAM ENGINE

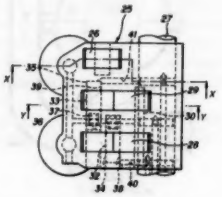
Masashi Sugiuchi, and Hiroshi Kamiyama, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohoma, Japan

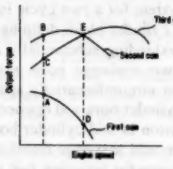
Filed Sep. 30, 1991, Ser. No. 767,335

Claims priority, application Japan, Oct. 3, 1990, 2-265995

Int. Cl.[5] F01L *1/34*

U.S. Cl. 123—90.16 **10 Claims**





1. A variable cam engine with a valve driven by cams which rotate in synchronism with the engine revolution, comprising:

a low speed power cam arranged so as to generate high power in the low speed region,

a high speed power cam arranged so as to generate high power in the high speed region,

an economy cam arranged so as to give good fuel cost performance,

means for detecting the running condition of the engine,

means for identifying a target cam from among said cams depending on the engine running condition detected by said running condition detecting means,

means for identifying a present cam,

means for selecting either a target cam or another cam, depending on whichever gives the smaller torque step with respect to the present cam identified by said present cam identifying means, and

a cam change-over mechanism which transmits the motion of the selected cam to said valve instead of the present cam.

5,159,906

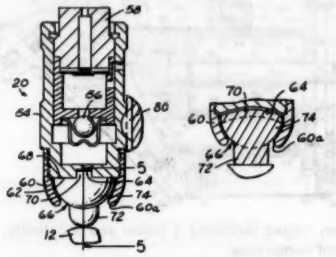
ADJUSTABLE VALVE SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Dominic Fontichiaro, Dearborn Hts., and Daniel M. Kabat, Oxford, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed May 3, 1991, Ser. No. 695,127

Int. Cl.[5] F01L *1/34*

U.S. Cl. 123—90.18 **7 Claims**



7. An adjustable valve system for an engine comprising:

an axially shiftable camshaft having a plurality of cam lobes for actuating engine valves, with at least one of said lobes having a profile which varies as a function of the axial position of said lobe; and

at least one valve lifter displaceable by said axially variable cam lobe, with said lifter comprising:

a generally cylindrical body adapted to be slidably received in a bore within said engine and having a first arcuate surface at one end of said body, with said arcuate surface having a keyway formed therein in a direction parallel to the axis of said camshaft; and

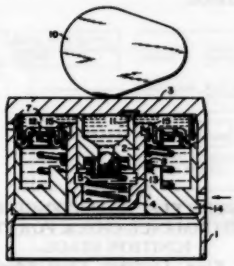
a camshaft rubbing block pivotably mounted to the lifter body and having a second arcuate surface in contact with said first surface and a spline projecting into said keyway, so that said rubbing block may accommodate axial shifting of said camshaft by pivoting about an imaginary axis which is perpendicular to the axis of the camshaft while being constrained by said spline and keyway from rotating about an axis parallel to said camshaft.

5,159,907

HYDRAULIC VALVE LIFTER

Volker Budde, Grosskarlbach, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim/Bergstrasse, Fed. Rep. of Germany

Filed Dec. 3, 1991, Ser. No. 803,270
Claims priority, application Fed. Rep. of Germany, Mar. 6, 1991, 4107041
Int. Cl.[5] F01L *1/24*
U.S. Cl. 123—90.55 5 Claims



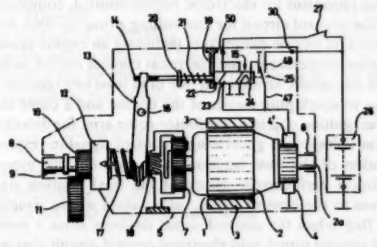
1. In a hydraulic valve lifter for an intake or exhaust valve in an internal combustion engine, said lifter comprising two hollow cylinders sealed off from each other with caps over their opposite ends and engaging each other axially by way of a compression spring, the improvement wherein said lifter further includes a back-up spring arranged in an opposing relationship to the compression spring and made of a shape memory metal alloy with a compression resistance that is lower, once an As temperature has been attained, than the compression resistance of the compression spring.

5,159,908

CRANKING DEVICE FOR INTERNAL COMBUSTION ENGINES

Manfred Eyermann, Illingen, and Josef Weigt, Vaihingen/Enz, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE89/00412, § 371 Date Dec. 28, 1990, § 102(e) Date Dec. 28, 1990, PCT Pub. No. WO90/02260, PCT Pub. Date Mar. 8, 1990
PCT Filed Jun. 23, 1989, Ser. No. 634,222
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828165; Jan. 24, 1989, 3901953
Int. Cl.[5] F02N *11/08*
U.S. Cl. 123—179.1 15 Claims



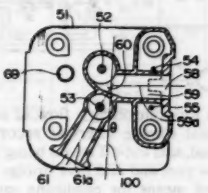
1. A cranking device for internal combustion engine, comprising a permanently excited starter motor having two brushes with respective connecting lines; a switching device having a change-over contact; and an engaging relay for actuating said change-over contact and having a braking impedance element arranged in said engaging relay, said change-over contact being movable between a first position in which it connects during a starting phase of said starter motor, the connecting lines of said two brushes to a voltage supply, and a second position in which it connects, during a rundown phase of said starting motor, the connecting lines of said two brushes to each other via said braking impedance element of said engaging relay.

5,159,909

VERTICAL INTERNAL COMBUSTION ENGINE WITH OVERHEAD VALVES

Kazuyuki Kobayashi, Nagoya, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1990, Ser. No. 621,019
Claims priority, application Japan, Feb. 22, 1990, 2-41522; Mar. 27, 1990, 2-30493[U]
Int. Cl.[5] H01L *3/00*
U.S. Cl. 123—188.14 6 Claims



1. A vertical internal combustion engine comprising:
a horizontally arranged cylinder;
overhead valves;
a vertically arranged crankshaft;
a carburetor arranged on one side of said cylinder;
a muffler arranged on another side of said cylinder, opposite said carburetor;
a suction port connected with said carburetor and forming a horizontal straight line portion and a curved portion, said curved portion leading from said horizontal straight line portion to a suction valve of said suction port;
said horizontal straight line portion being formed along a center line which substantially intersects a center of said carburetor;
an exhaust port connected with said muffler, said exhaust port including an exhaust port center line passing through an exhaust valve and crossing said center line of said horizontal straight line portion diagonally from below.

5,159,910

LUBRICATING APPARATUS FOR INTERNAL COMBUSTION ENGINE

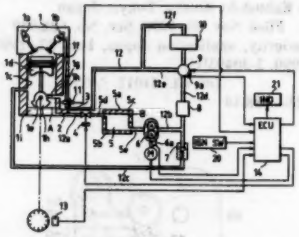
Masakazu Ninomiya; Norio Omori, both of Kariya, and Satoshi Nakagawa, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed May 24, 1991, Ser. No. 704,982
Claims priority, application Japan, May 24, 1990, 2-134750
Int. Cl.[5] F01M *5/00*
U.S. Cl. 123—196 AB 11 Claims

1. A lubricating apparatus for an internal-combustion engine, comprising:
detection means for detecting whether or not said engine is on;
a heat storage reservoir for storing lubricating oil and maintaining its temperature, said lubricating oil passing through an outflow port and an inflow port of said engine, said heat storage reservoir being connected to said outflow and inflow ports by a circular pipe system, said heat storage reservoir being provided outside of said engine;
a hydraulic pump, driven by a motor, provided between said inflow port and said heat storage reservoir, for controlling supply of said lubricating oil stored in said heat storage reservoir to portions of said engine requiring lubrication

through said inflow port and said circular pipe system based upon a control signal;

first control means for producing said control signal to stop said hydraulic pump in order to maintain a temperature of said lubricating oil stored in said heat storage reservoir, based upon said detection means detecting that said engine has stopped, and for producing said control signal to cause said hydraulic pump to supply said lubricating oil, with its temperature maintained by said heat storage reservoir, to said portions of said engine;



cut-off means for controlling a flow of said lubricating oil into said heat storage reservoir according to a second control signal, said cut-off means being provided between said outflow port and said heat storage reservoir; and

second control means for producing said second control signal to stop said flow when a predetermined time period has passed, based upon said detection means detecting that said engine has stopped, and for producing said second control signal to start said flow, based upon said detection means detecting that said engine is running.

5,159,911

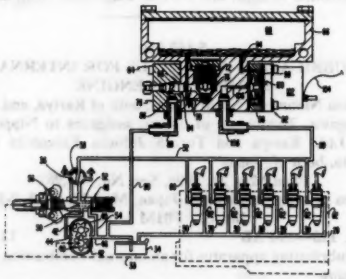
HOT START OPEN NOZZLE FUEL INJECTION SYSTEMS

John C. Williams, Columbus; Kevin W. Westerson, Nashville; George L. Muntean, Columbus, all of Ind., and Thomas W. Sullivan, Blue Springs, Mo., assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Jun. 21, 1991, Ser. No. 718,981

Int. Cl.[5] F02M *55/00*

U.S. Cl. 123—467 **29 Claims**



1. A fuel leakage prevention system for eliminating undesired leakage of fuel into the combustion chambers of a multicylinder internal combustion engine from a plurality of corresponding fuel injectors supplied with fuel by a common rail connected to the fuel injectors, comprising

a main housing containing an evacuatable chamber;

vacuum forming means fluidically connected with said evacuatable chamber and adapted to be fluidically connected with a source of sub-atmospheric pressure during engine operation;

vacuum applying means connected with said evacuatable chamber and adapted to be fluidically connected with the common rail, said vacuum applying means including a first valve means for fluidically connecting said evacuatable chamber to the common rail when operating in a first mode in response to a control signal and for fluidically isolating the common rail from said evacuatable chamber when operating in a second mode in response to a control signal; and

control means for supplying said control signal to said first valve means to cause said first valve means to operate in said first mode during engine shut-down and to cause said first valve means to operate in said second mode during engine operation.

5,159,912

APPARATUS FOR ELECTRONIC ENGINE CONTROL WITH PERFORMANCE CHECK FOR THE FINAL IGNITION STAGE

Hermann-Josef Klein, Landshut; Klaus Adam, Asperg, and Juergen Wuerth, Freiberg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

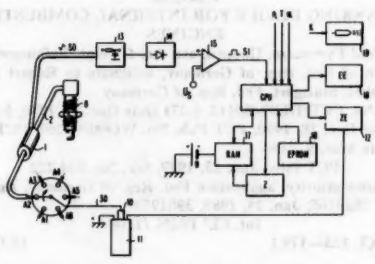
PCT No. PCT/DE89/00515, § 371 Date Feb. 11, 1991, § 102(e) Date Feb. 11, 1991, PCT Pub. No. WO90/02873, PCT Pub. Date Mar. 22, 1990

PCT Filed Aug. 5, 1989, Ser. No. 654,647

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1988, 3829797

Int. Cl.[5] F02P *17/00*; F02D *41/22, 41/34*

U.S. Cl. 123—481 **1 Claim**



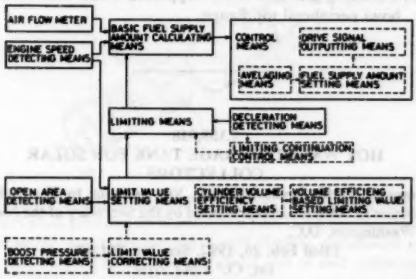
1. An apparatus for electronic engine control, comprising an electrical control circuit for controlling a final ignition stage as a function of engine parameters including an engine speed and an engine temperature, said electrical control circuit including at least one sensor arranged at one of at least one ignition cable leading to spark plug means of the engine and a cable leading from an ignition coil to a distributor rotor arm, for detecting an ignition voltage and generating a control signal in response to activation of the final ignition stage, and control means for effecting a performance check of the final ignition stage in response to the control signal, said control means emitting an error flag when the control signal deviates from a predetermined control signal, said electrical control circuit also including a counter to which the error flag is fed as a counting pulse, fuel injection being switched off when a reference counter state is reached, said control means including a read-only memory for storing a reference counter state, and a battery-buffered memory for storing an actual counter state, the fuel injection being first switched on again when a thrust cut-off is effected by release of an accelerator pedal.

5,159,913

METHOD AND SYSTEM FOR CONTROLLING FUEL SUPPLY FOR INTERNAL COMBUSTION ENGINE COUPLED WITH SUPERCHARGER

Junichi Furuya, Isesaki, Japan, assignor to Japan Electronic Control Systems Co., Ltd., Isesaki, Japan

Filed Nov. 26, 1991, Ser. No. 797,940
Claims priority, application Japan, Nov. 27, 1990, 2-321045
Int. Cl.[5] F02D *23/02, 41/12*
U.S. Cl. 123—493 **12 Claims**



1. A method of controlling a supply of fuel to an internal combustion engine coupled with a supercharger, comprising the steps of:

calculating a basic fuel supply amount on the basis of an intake air flow rate measured by an air flow meter located within an air induction passage upstream of a compressor of said supercharger, and an engine revolution speed;

setting a limit value for said basic fuel supply amount on the basis of an air flow path area of an air induction system, which is variable, and the engine revolution speed;

limiting said basic fuel supply amount to be less than or equal to said limit value when a deceleration state of the engine is detected; and

controlling a supply of fuel to the engine based on said basic fuel supply amount.

5,159,914

DYNAMIC FUEL CONTROL

William C. Follmer, Livonia; Jeffry A. Greenberg, Ann Arbor, and Isis A. Messih, Troy, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 1, 1991, Ser. No. 786,494
Int. Cl.[5] F02D *41/04*
U.S. Cl. 123—494 **7 Claims**

1. A method of controlling the air/fuel ratio of an internal combustion engine including the steps of:

predicting the air charge to enter the engine in two engine events using the equation

$$M_{i+2}{}^{c}=(2-k)k\,[2\,M_i{}^{tb}-M_{i-1}{}^{tb}]+(1-k)^2 M_i{}^{c}$$

wherein

M^c=Cylinder air charge

M^{tb}=Air charge from throttle flow

$$k=\left(\frac{1}{ncyl}\right)\left(\frac{Vd}{Vm}\right)\times N\times\eta_v$$

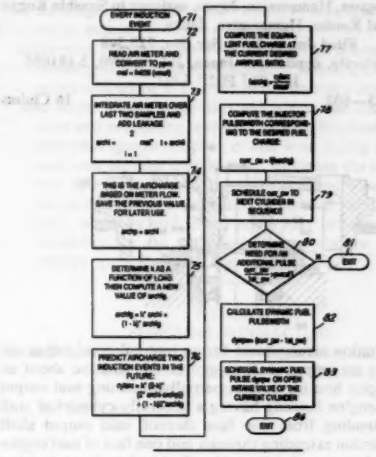
ncyl=Number of cylinders

N=Engine speed (RPM)

Vd=Engine displacement(cu.in.)

Vm=Manifold volume(cu.in.)

η_v=Volumetric efficiency.

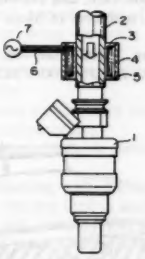

EVERY INDUCTION EVENT
71
72
READ AIR METER AND CONVERT TO
73
INTEGRATE AIR METER OVER LAST TWO SAMPLES AND ADD LEAKAGE
74
THIS IS THE AIRCHARGE BASED ON METER FLOW. SAVE THE PREVIOUS VALUE FOR LATER USE.
75
DETERMINE k AS A FUNCTION OF LOAD. THEN COMPUTE A NEW VALUE OF
76
PREDICT AIRCHARGE TWO INDUCTION EVENTS IN THE FUTURE.
77
COMPUTE THE EQUIVALENT FUEL CHARGE AT THE CURRENT DESIRED AIR/FUEL RATIO.
78
COMPUTE THE INJECTOR PULSEWIDTH CORRESPONDING TO THE DESIRED FUEL CHARGE.
79
SCHEDULE TO NEXT CYLINDER IN SEQUENCE
80
DETERMINE IF NEED FOR AN ADDITIONAL PULSE
81
EXIT
82
CALCULATE DYNAMIC FUEL PULSEWIDTH
83
SCHEDULE DYNAMIC FUEL PULSE (open OR OPEN INTAKE VALVE OF THE CURRENT CYLINDER
84
EXIT

5,159,915

FUEL INJECTOR

Kimitaka Saito, Nagoya; Tatsuyoshi Matsumoto, Okazaki, and Toshihiko Igashira, Toyokawa, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Mar. 2, 1992, Ser. No. 844,748
Claims priority, application Japan, Mar. 5, 1991, 3-38646; Nov. 8, 1991, 3-293190; Nov. 8, 1991, 3-293196
Int. Cl.[5] F02M *31/00*
U.S. Cl. 123—557 **20 Claims**



1. A fuel injector for injecting a heated fuel into a combustion engine, comprising,

electro-magnetic coil means for generating a fluctuating magnetic flux density,

fuel heating means in which the fluctuating magnetic flux density is generated by the electro-magnetic coil means so that the fuel heating means is heated by the fluctuating magnetic flux density and a heat energy of the fuel heating means generated by the fluctuating magnetic flux density is transmitted to the fuel to supply the heated fuel, and

fuel path means in which the fuel flows to be injected from the fuel injector into the combustion engine and in which the fuel heating means is arranged to heat the fuel, wherein

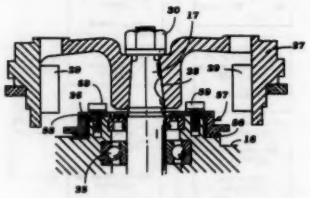
a magnetic permeability of the fuel heating means is larger than that of the fuel path means so that a magnetic flux density in the fuel heating means is larger than a magnetic flux density in the fuel path means.

5,159,916

IGNITION TIMING CONTROL MEMBER SUPPORTING STRUCTURE OF OUTBOARD MOTOR

Atsushi Isogawa, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jul. 3, 1991, Ser. No. 725,548
Claims priority, application Japan, Jul. 9, 1990, 2-181056
Int. Cl.[5] F02P *5/02*
U.S. Cl. 123—602 **16 Claims**



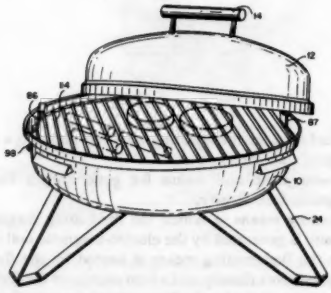
1. An ignition arrangement for an internal combustion engine having an output shaft supported for rotation about an axis, an engine housing at least partially enclosing said output shaft, said engine housing having a generally cylindrical wall section extending from one face thereof, said output shaft having a portion extending through said one face of said engine housing and surrounded by said cylindrical wall, an ignition plate having a hub portion rotatably journaled on the outer surface of said cylindrical wall by an anti-friction bushing interposed between said hub portion of said ignition plate and the outer surface of the cylindrical wall, a retaining plate affixed to the end surface of said cylindrical wall inwardly of said outer surface for retaining said ignition plate to said engine, a flywheel affixed for rotation with said output shaft, and at least one ignition coil affixed to said ignition plate and cooperating with said flywheel.

5,159,917

PORTABLE BARBECUE COOKING GRILL

Robert Archer, Johnson City, and Harold O. Duggin, Greeneville, both of Tenn., assignors to Meco Corporation, Greeneville, Tenn.

Filed Dec. 3, 1991, Ser. No. 801,228
Int. Cl.[5] A47J *37/00;* **F24B** *3/00*
U.S. Cl. 126—25 R **3 Claims**



1. A portable barbecue cooking grill comprising:

a) a cooking bowl having an hemispherical body with a peripheral top flange at its open top and an inset shoulder adjacent said top flange as a support for a cooking grill;

b) a plurality of supporting legs affixed to a lower portion of said cooking bowl;

c) a removable hood of hemispherical configuration having a peripheral bottom flange complementally supported within the peripheral flange of said cooking bowl, such that said cooking bowl peripheral top flange and said bowl peripheral bottom flange engage and overlap each other, said hood further including:

i. a pair of radially inwardly extending locking studs supported in said peripheral bottom flange, and

ii. an insulated handle supported upon the top of said hood;

d) lock means in the form of a pair of inset brackets supported in said cooking bowl adjacent said peripheral top flange, each said bracket including a locking aperture engageable with a hood locking stud upon lateral rotation of said hood with respect to said cooking bowl; and

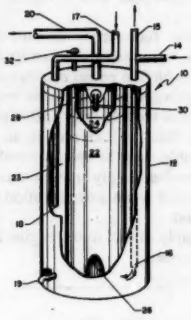
e) a cooking grill removably supported within said cooking bowl peripheral top flange.

5,159,918

HOT WATER STORAGE TANK FOR SOLAR COLLECTORS

James S. Roehl, Fredericksburg, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 26, 1992, Ser. No. 841,699
Int. Cl.[5] F24J *2/04*
U.S. Cl. 126—437 **8 Claims**



1. A hot water storage tank for a solar collector system comprising:

a. a cylindrical storage tank;

b. a cylindrical baffle positioned concentrically within said storage tank, thereby forming an outer annular storage volume and an inner cylindrical storage volume, and having diametrically opposed upper and lower circulation ports thereby allowing transfer of water between the inner and outer volumes;

c. a cold water inlet providing a cold water supply to a solar collector system and to a first side of the outer annular storage volume;

d. a collector-water inlet providing pre-heated solar collector water to a second side of the outer annular storage volume;

e. a hot water outlet connected to the upper part of the inner storage volume of said storage tank;

f. an electric heater element for providing supplemental heating connected to said cylindrical storage tank and extending inward through the outer annular storage volume and through the upper circulation port into the inner cylindrical storage volume;

g. a relief valve for venting excess pressure connected to the upper part of said cylindrical storage tank; and

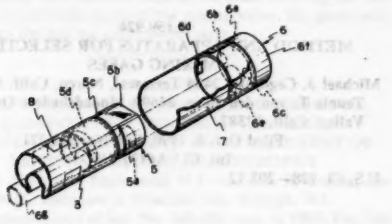
h. a drain connected to the lower part of said cylindrical storage tank.

5,159,919

ENDOSCOPE COVER

Toshio Chikama, Tokyo, Japan, assignor to Machida Endoscope Co., Ltd., Tokyo, Japan

Filed Jan. 31, 1991, Ser. No. 648,196
Claims priority, application Japan, Feb. 1, 1990, 2-008123
Int. Cl.[5] A61B *1/00*
U.S. Cl. 128—4 **9 Claims**



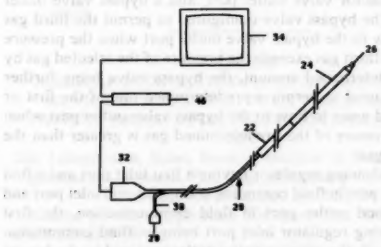
1. In combination, an endoscope having a distal end with an observation port and an illumination port and a handle, and an endoscope cover comprising a stiff flexible cylindrical end portion adapted to fit over said distal end of said endoscope, said endoscope cover further comprising a covering portion attached to said stiff flexible cylindrical end portion, said covering portion substantially conforming to the shape of said endoscope and extending from the stiff flexible cylindrical end portion to said handle, groove means formed in the distal end of said endoscope, anchoring projections formed in said stiff flexible cylindrical end portion to fit into said groove means to fixedly attach said endoscope cover to said endoscope, thereof separated from a covering portion of said stiff flexible cylindrical end portion, said stiff flexible cylindrical end portion being deformable to move said anchoring projections away from fitting into said groove means, whereby the endoscope cover can be removed by merely pressing on said flexible cylindrical end portion so as to move said anchoring projections out of said groove means.

5,159,920

SCOPE AND STENT SYSTEM

Dennis E. Condon, Santa Barbara; Robert S. Bley, Goleta, and Bobby Purkait, Santa Barbara, all of Calif., assignors to Mentor Corporation, Goleta, Calif.

Filed Jun. 18, 1990, Ser. No. 539,865
Int. Cl.[5] A61B *17/00*
U.S. Cl. 128—6 **33 Claims**



1. A scope and stent comprising:
a ureteral stent in the form of a relatively flexible tubular member having first and second stent ends;
an elongate flexible scope means having a first scope end for insertion into a patient's urinary tract and a second scope end for remaining outside a patient's body, said scope means having:
illumination means for illuminating objects in the vicinity of said first scope end;
imaging means adjacent said first end thereof for providing an image of objects in the vicinity of said first end of said scope means;
conveying means for conveying the image provided by said imaging means to the second end of said scope for viewing when said scope is inserted into a patient's urinary tract;
said scope means being disposed within the lumen of said stent and supporting said stent along a longitudinal axis of said stent against buckling of said stent during insertion of said stent into the urinary tract, including the ureter, such that said stent is always locally essentially parallel with said scope means as said stent is inserted into the urinary tract, whereby said scope means may provide a viewing capability for the stent insertion procedure within the urinary tract, including the ureter.

5,159,921

SURGICAL RETRACTOR

Rocklin L. Hoover, Rte. 3, Box 314-X, Sumter, S.C. 29154

Filed Nov. 27, 1990, Ser. No. 618,393
Int. Cl.[5] A61B *17/02*
U.S. Cl. 128—20 **13 Claims**

1. A device for use in holding open a surgical incision, said device comprising:
a compartment having a wall defining an interior surface and an exterior surface, a tissue engaging side of said exterior surface and a tissue opposing side of said exterior surface, said compartment being generally conformable to the shape of said incision,
said wall on said tissue opposing side carrying means for resisting punctures;
means for illuminating said incision, said illuminating means carried by said compartment;
a matrix of elastically deformable elements within said compartment;
means for communicating with said interior surface of said compartment so that any fluid in said compartment can be withdrawn and said compartment sealed, said compartment holding said surgical incision open when said fluid is withdrawn and said communicating means sealed.

5,159,922

MASSAGER

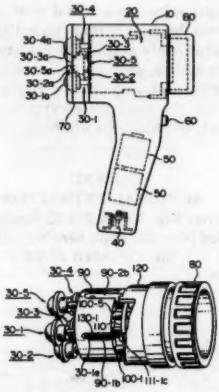
Seiya Mabuchi, and Tatsuo Katsunuma, both of Kashiwa, Japan, assignors to Bio Pit Co., Ltd., Chiba, Japan

Division of Ser. No. 449,551, Dec. 11, 1989, Pat. No. 5,088,474. This application Dec. 6, 1991, Ser. No. 803,463
Claims priority, application Japan, Dec. 28, 1988, 63-332308; Jan. 1, 1989, 1-7132
Int. Cl.[5] A61H *7/00*
U.S. Cl. 128—52 **7 Claims**

1. A massager comprising:
pushing attachments;
drive means for reciprocating said pushing attachments, said drive means having a rotating cam means engaging with each of said pushing attachments, said rotating cam means formed in such a manner that a position of said pushing attachments in a reciprocating direction sequentially

changes corresponding with a rotating angle position of said rotating cam means, a length of said reciprocation of said pushing attachments corresponding with a rotating angular position of said rotating cam means, said pushing attachments being sequentially driven by said rotating cam means;

independent energy storage means for each pushing attachment storing energy when corresponding said pushing



attachment is retracted and releasing said stored energy when said corresponding pushing attachment is moved forward;

a pushing force adjusting plate adapted to be slidable with respect to said attachments; and

adjusting means for adjusting the position of said adjusting plate for selectively varying the energy in each of said independent energy storage means.

5,159,923

DIVING HELMET

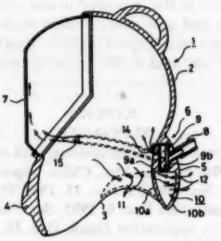
Masahiko Kaburaki, Tokyo, Japan, assignor to Tohgun Kigyo Co., Ltd., Tokyo, Japan

Filed Jun. 4, 1991, Ser. No. 710,109

Claims priority, application Japan, Jun. 14, 1990, 2-154043

Int. Cl.[5] B63C *11/02*

U.S. Cl. 128—201.27 **2 Claims**



1. A diving helmet which comprises: a head and a body-contacting portion made of rigid material with

relatively large thickness to act as weight, the head comprising

a transparent front window; an air supply chamber connected with an air supply tube at a back

portion of the helmet; an air exhaust chamber which is provided beneath the air supply

chamber, a front wall of the air exhaust chamber having an exhaust guide hole, a back wall of the air exhaust chamber having an air exhaust hole; and a plurality of air holes which allow the air supply chamber to

communicate with an inside of the helmet, at least one of the air holes being extended close to the front window through the wall of the helmet, the extended air hole opening towards the front window and blowing against the window, thereby taking off blur or mist on the window and enhancing the wearing comfort of said helmet.

5,159,924

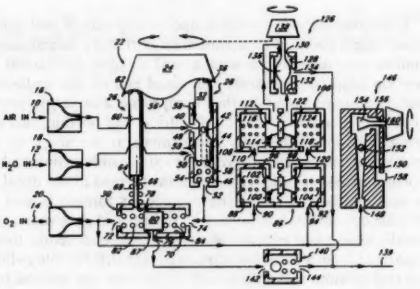
METHOD AND APPARATUS FOR SELECTIVELY MIXING GASES

Michael J. Cegielski, 2404 Temescal, Norco, Calif. 91760, and Teunis T. van den Berg, 24699 Moondshadow Dr., Marino Valley, Calif. 92387

Filed Oct. 3, 1990, Ser. No. 592,271

Int. Cl.[5] A61M *15/00*

U.S. Cl. 128—203.12 **26 Claims**



1. A mixing device for respiratory or therapeutic use which mixes two gases from three separate pressurized gas supplies containing at least one sustaining gas and one harmful gas, while preventing the patient from inadvertently receiving a flow of harmful gas in the event the supply of the sustaining gas inadvertently fails, comprising:

a selector valve having a first inlet port fluidly connected to a first gas supply, a second inlet port fluidly connected to a second gas supply, one of the first or second gas supplies containing a harmful gas, and a selector valve outlet port, the selector valve configured to selectively permit fluid passage of only one of the first or second gas supplies to the selector valve outlet port;

a bypass valve having a first inlet port fluidly connected to a third gas supply, a second inlet port fluidly connected to the selector valve outlet port, and a bypass valve outlet port, the bypass valve configured to permit the third gas to flow to the bypass valve outlet port when the pressure of the third gas exceeds the pressure of the selected gas by a predetermined amount, the bypass valve being further configured to permit a predetermined one of the first or second gases to flow to the bypass valve outlet port when the pressure of the predetermined gas is greater than the third gas;

a first balancing regulator having a first inlet port and a first outlet port in fluid communication, a second inlet port and a second outlet port in fluid communication, the first balancing regulator inlet port being in fluid communication with the selector valve outlet port and to the bypass valve inlet port, and with the second inlet port of the first balancing regulator being in fluid communication with the third gas supply, the first balancing regulator providing a substantially equal gas pressure at the first and second outlet ports when the selected gas and the third gas are communicated to the balancing regulator, the balancing regulator preventing passage of the higher pressure gas

when the pressure differential at the balance regulator between the selected gas and the third gas reaches a predetermined amount; and

a mixing valve having a first inlet port in fluid communication with the first outlet port of the first balancing regulator, a second inlet port in fluid communication with the second outlet port of the first balancing regulator, and a mixing valve outlet port, the mixing valve having two valve seats and an obstruction selectively positionable relative to those valve seats to selectively provide a predetermined flow ratio of each of the gases entering the first and second inlet ports of the mixing valve, the gases passing to the mixing valve outlet port.

5,159,925

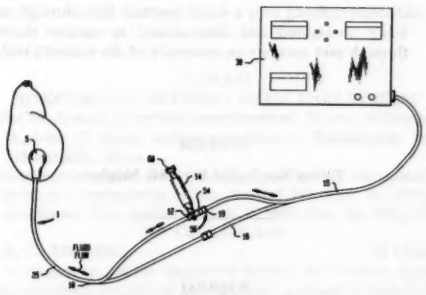
CAUTERIZING APPARATUS AND METHOD FOR LAPAROSCOPIC CHOLECYSTOSTOMY, GALLBLADDER ABLATION AND TREATMENT OF BENIGN PROSTATE HYPERTROPHY

Robert S. Neuwirth, Englewood, N.J., and Lee R. Bolduc, Raleigh, N.C., assignors to Gynelab, Inc., Raleigh, N.C.

Continuation-in-part of Ser. No. 565,154, Aug. 9, 1990, Pat. No. 5,105,808, which is a division of Ser. No. 242,730, Sep. 9, 1988, Pat. No. 4,949,718. This application Jan. 28, 1991, Ser. No. 646,669

Int. Cl.[5] A61F *7/12*

U.S. Cl. 128—401 **6 Claims**



1. A method for effecting necrosis of gallbladder tissue lining comprising the steps of:

inserting a distendable bladder into the gallbladder;

inflating the inserted bladder with an inflation medium to an appropriate volume to assure the bladder's contact with substantially all of the gallbladder tissue lining; and

heating the inflating medium to about 190° fahrenheit for a period of about 2 to 6 minutes to effect necrosis of the tissue.

5,159,926

MEDICAL STIMULATION AND/OR MONITORING DEVICE INTERACTING WITH THE BODY OF A PATIENT BASED UPON SELECTABLE PARAMETER SET

Jan Ljungstroem, Solna, Sweden, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Aug. 28, 1990, Ser. No. 573,794

Claims priority, application European Pat. Off., Aug. 28, 1989, 89115857.8

Int. Cl.[5] A61N *1/365*

U.S. Cl. 128—419 PG **8 Claims**

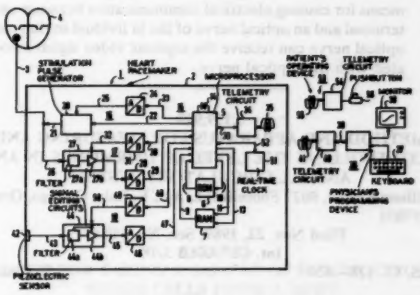
1. A medical device comprising:

a housing having a size adapted for implantation in the body of a patient;

means adapted for interacting with the body of said patient with respect to a physiological function of the patient;

control means in said housing and electrically connected to said means adapted for interacting, for defining the interaction of said means adapted for interacting on the basis of a parameter set;

a memory in said housing containing a plurality of different parameter sets each parameter set comprising values of a plurality of individual parameters matched to a specific set of physiological conditions of said patient with each set of conditions requiring a different interaction with said patient by said means for interacting, and each of said parameter sets being stored as a set at a specific Address of said memory;



said control means including means for fetching one of said parameter sets at a time for use by said control means; and

switch means connected to said control means for enabling only the address of a parameter set matched to current conditions, said switch means including pacemaker wearer-operated means for selecting an address which is to be enabled, said pacemaker wearer-operated means being an external unit and further including means for telemetrically communicating between said control means in said housing and said external unit.

5,159,927

VISUAL PROSTHESIS APPARATUS AND METHOD

Ferdinand Schmid, 1205 Maple St., Santa Monica, Calif. 90405

Continuation-in-part of Ser. No. 385,269, Jul. 26, 1989, abandoned. This application Apr. 5, 1991, Ser. No. 681,101

Int. Cl.[5] A61N *1/00*

U.S. Cl. 128—419 R **19 Claims**

1. A visual prothesis apparatus for operative insertion in the optical pathway to the brain of an individual having an eye which is blind or partially blind, said apparatus comprising:

a) a video camera having means for generating a plurality of individual video signals in response to viewing of an image over a period of time,

b) an insert for implantation in the eye socket in place of the eye which is blind or partially blind,

c) connecting means in said insert enabling receipt of video signals from the video camera and having a number of

individual terminals so that each terminal will carry a separate one of the video signals,

d) cable means for electrically connecting the video camera to the connecting means in said insert and for delivering the video signals to the insert, the cable means carrying the individual video signals generated by said video camera to the individual terminals of said connecting means,

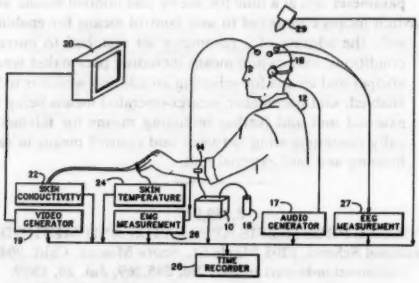
e) an optical nerve connecting assembly in said insert and having a plurality of individual nerve connecting terminals connected to said terminals of said connecting means such that each individual terminals of the connecting means receives a separate one of the video signals, and said nerve connecting assembly having communication means for causing electrical communication between each terminal and an optical nerve of the individual so that each optical nerve can receive the separate video signal associated with that optical nerve.

5,159,928

METHOD AND APPARATUS FOR MEASURING AND CONTROLLING THE LEVEL OF HORMONES IN AN ANIMAL CIRCULATORY SYSTEM

William Keppel, 5027 Foothill Rd., Apt. E, Lake Oswego, Oreg. 97034

Filed Nov. 22, 1989, Ser. No. 440,977
Int. Cl.[5] A61B *5/00*
U.S. Cl. 128—630 **25 Claims**



1. A method for determining the relationship between selected non-invasive sensory stimuli supplied to an animal subject and the level of cytokines in the circulatory system of that subject, comprising:

(a) periodically taking discrete samples of the blood of the subject at known times;

(b) while said samples are being taken, supplying to said subject one or more of said selected non-invasive stimuli at known times;

(c) measuring the amount of said cytokines in said discrete samples; and

(d) correlating the amount of said cytokines in said discrete samples with the time of occurrence of said selected non-invasive stimuli supplied to said subject so as to identify the relationship therebetween.

5,159,929

INSULATED RF SHIELD

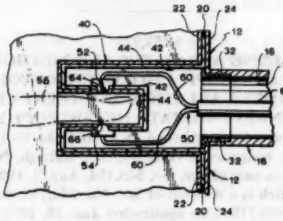
G. Ronald Morris, 48 S. Montgonery Ave., Bay Shore, N.Y. 11706, and Charles E. McMillen, 185 Cypress Dr., Versailles, Ky. 40383

Filed Jun. 14, 1990, Ser. No. 538,398
Int. Cl.[5] A61B *5/055*
U.S. Cl. 128—653.2 **25 Claims**

1. A radio frequency shield for use adjacent an extremity of a patient's body during a magnetic resonance examination by magnetic resonance examination apparatus, comprising:

(A) an electrically conductive layer having a pair of opposed surfaces;

(B) a pair of electrically insulative layers, one of said insulative layers being disposed adjacent one of said opposed surfaces for positioning intermediate said conductive layer and the patient's extremity to insulate the patient's extremity from said conductive layer, and the other of said insulative layers being disposed adjacent the other side of said conductive layer and other material to insulate the other material from said conductive layer; and



(C) an electrically conductive article disposed adjacent said other insulative layer;

said conductive layer and said pair of insulative layers defining a shielding element essentially enclosing a volume including therein said electrically conductive article;

said shield defining only a single aperture therethrough and being configured and dimensioned to receive therein through said aperture an extremity of the patient's body.

5,159,930

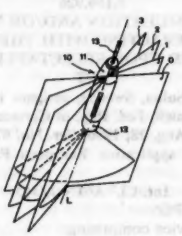
Patent Not Issued For This Number

5,159,931

APPARATUS FOR OBTAINING A THREE-DIMENSIONAL RECONSTRUCTION OF ANATOMIC STRUCTURES THROUGH THE ACQUISITION OF ECHOGRAPHIC IMAGES

Riccardo Pini, 27 Via delle Porte Nuove, I-50144 Firenze FI, Italy

Filed Nov. 20, 1989, Ser. No. 438,292
Claims priority, application Italy, Nov. 25, 1988, 09532 A/88
Int. Cl.[5] A61B *8/00*
U.S. Cl. 128—660.07 **26 Claims**



1. An apparatus for obtaining three-dimensional echographic images comprising:

a two-dimensional image scanning means having a piezoelectric transducer contained in an echographic probe,

having means for movement in predetermined angular increments for a predetermined number of times;
means for digitalization of each two-dimensional image produced by said two-dimensional image scanning means;
means for recording each two-dimensional image and the angular position of the recorded image;
means for selecting in all the two-dimensional images, the vectors of horizontal pixels corresponding to a current polar plane;
means for transformation of said vector coordinates from polar to cartesian coordinates;
means for vector interpolation and construction of a polar image consisting of pixels;
means for incrementing the polar plane number;
means for recording in memory the three-dimensional matrix of pixels; and
means for display of two-dimensional echographic images obtained by selecting a section plane of the three-dimensional matrix.

5,159,932

MYOCARDIAL ISCHEMIA DETECTION SYSTEM

John M. Zanetti, Long Lake, and David M. Salerno, Minneapolis, both of Minn., assignors to Seismed Instruments, Inc., Minneapolis, Minn.

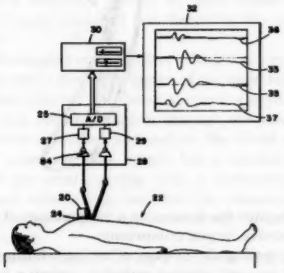
Continuation of Ser. No. 690,635, Apr. 24, 1991, abandoned, which is a continuation of Ser. No. 495,262, Mar. 16, 1990, abandoned. This application Feb. 7, 1992, Ser. No. 833,630

Int. Cl.[5] A61B *5/04*

U.S. Cl. 128—696 **21 Claims**

1. Apparatus for the diagnostic display of a motion signal; characterizing ventricular wall motion f a patient's heart; from cardiac induced compression waves detected at the surface of said patient's body; to a diagnostician comprising:

compression wave monitoring means, responsive to compression waves at the surface of said patient's body, for



generating a plurality of compression wave signals corresponding to said ventricular wall motion;

selecting means for detecting the systolic time interval of normal sinus beats of said patient's heart, and for generating a data collection window interval during such systolic time interval;

means for averaging said compression wave signals collected during said data collection window intervals; and for generating a composite wave form from said collected compression wave signals

display means for presenting a representation of said composite waveform to said diagnostician.

5,159,933

DEVICE FOR TAKING A SAMPLE OF SUBCUTANEOUS TISSUE CELLS FROM A BODY

Pieter K. H. Hut, Haren, Netherlands, assignor to Metrias, B.V., Netherlands

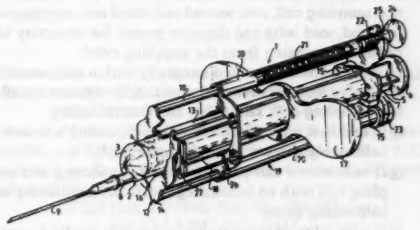
PCT No. PCT/NL89/00025, § 371 Date Jan. 6, 1990, § 102(e) Date Jan. 6, 1990, PCT Pub. No. WO89/10092, PCT Pub. Date Nov. 2, 1989

PCT Filed Apr. 18, 1989, Ser. No. 455,392

Claims priority, application Netherlands, Apr. 18, 1989, 8801002

Int. Cl.[5] A61B *10/00*

U.S. Cl. 128—753 **9 Claims**



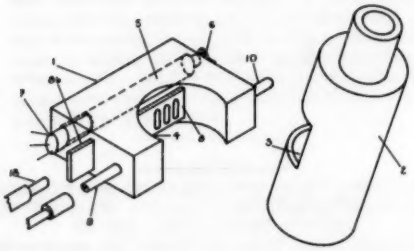
1. Apparatus for taking a sample of subcutaneous tissue cells from a body comprising a disposable injection syringe with a cylinder; a plunger slidably arranged in said cylinder and connected to an actuating shaft protruding outside said cylinder at one end, and connected to a coupling element at the opposite end of said cylinder for the coupling thereto of an injection needle; and further pulling means for the exerting of a force on said plunger in the direction away from said coupling element, said pulling means including on one side energy transmitting biasing means coupled to said cylinder which exerts a tensile force on said plunger such that after a movement of said plunger in the order of magnitude of 1 cm from an outermost position in contact with the end of said cylinder bearing said coupling element, the tensile force on said plunger lies in the order of magnitude of 10 Newton times the diameter of said cylinder in cm^2.

5,159,934

MINIATURE SENSOR FOR MAINSTREAM CAPNOMETRY/CAPNOGRAPHY INSTRUMENTATION

Max Hoberman, 943 Prince St., Teaneck, N.J. 07666

Filed Sep. 10, 1990, Ser. No. 579,561
Int. Cl.[5] A61B *5/08*
U.S. Cl. 128—719 **7 Claims**



1. A miniature IR sensor for use in main-stream Capnometry/Capnography instrumentation, comprising:

(a) a breathing tube;

(b) an assembly including a first inlet port, a second exit port, and a third port in said assembly, said third port arrayed in and through a wall portion of said assembly and communicating with said first inlet port and second exit port, said assembly attached in series with said breathing tube carrying breathing gases for evaluation by said miniature IR sensor;

(c) a partially circular cutout portion in said assembly fitting onto and into said breathing tube and providing a substantially air tight connection therewith;

(d) a sampling cell formed interior of said assembly;

(e) a source of infra-red radiation mounted at a first end of the sampling cell, said infra-red source arrayed for passing said radiation into said sampling cell;

(f) an infra-red detector means mounted at a second end of said sampling cell, said second end distal and opposite said first end, said infra-red detector means for detecting said radiation emerging from the sampling cell;

(g) a valve member mounted integrally within said assembly, said valve member arrayed immediately adjacent a wall of said sampling cell, said valve member including:

(g1) said first inlet port for fluidly connecting a source of calibrating gases with the sampling cell;

(g2) said second exit port for fluidly connecting said sampling cell with an exhausting means for exhausting said calibrating gases;

(g3) a plurality of elongated passageways fluidly connecting said breathing gases in said breathing tube with said sampling cell;

(g4) an extended portion means of said valve member moving said valve member from a first normal operating position to a second calibrating position;

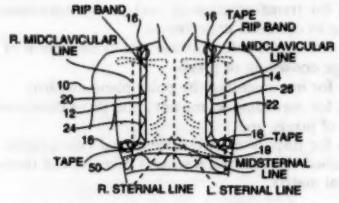
(h) an actuating means for engaging said extended portion means of said valve member, said actuating means arranged for selectively moving said extended portion means and valve member between said first normal operating position and said second calibrating position; said first normal operating position allowing only the breathing gases carried in said breathing tube to enter said sampling cell, and said second calibrating position allowing said calibrating gases to enter said sampling cell and excluding said breathing gases from entering said sampling cell, said second calibrating position allowing said calibrating gases to be exhausted from said sampling cell.

5,159,935

NON-INVASIVE ESTIMATION OF INDIVIDUAL LUNG FUNCTION

Marvin A. Sackner, Miami Beach, Fla., and Joathan D. Sackner, New York, N.Y., assignors to Nims, Inc., Miami Beach, Fla.

Filed Mar. 8, 1990, Ser. No. 491,675
Int. Cl.[5] A61B *5/08, 5/113*
U.S. Cl. 128—721 **39 Claims**



1. A non-invasive method for monitoring individual lung function in a subject having a torso and right and left sides of the torso defined on opposite sides of a midsternal line, comprising:

disposing a transducer on the subject's torso, said transducer being disposed on one only of the right and the left sides of the subject's torso for overlying only a portion of the chest and back of the subject's torso above an individual lung to be monitored, said transducer producing a signal corresponding to the movement of the portion therebeneath; and

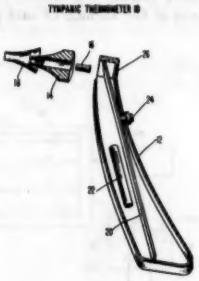
monitoring the signal produced by said transducer, said signal corresponding to volume changes in the underlying individual lung.

5,159,936

NONCONTACT INFRARED TYMPANIC THERMOMETER

Mark Yelderman, 5205 Terrace View Rd., Plano, Tex. 75093; Daniel S. Goldberger, 1035 Douglas St., San Francisco, Calif. 94114, and James R. Braig, 6147 Chelton Dr., Oakland, Calif. 94611

Filed Aug. 17, 1990, Ser. No. 570,205
Int. Cl.[5] A61B *5/00*; G01J *5/10*
U.S. Cl. 128—736 **21 Claims**



1. An apparatus for measuring a temperature of an infrared radiation emissive target, comprising:

means for sensing the amount of incident infrared radiation emitted by said infrared radiation emissive target, comprising:

a substrate,

first and second thermopiles, connected in opposed relation to each other and positioned on the same said substrate so as to receive incident infrared radiation

emitted by said infrared radiation emissive target and by an ambient environment of said first and second thermopiles, for producing output electrical signals representative of the intensity of said incident infrared radiation,

a bandpass filter, disposed in an energy path between said infrared radiation emissive target and said first and second thermopiles, for passing a predetermined range of infrared wavelengths of incident infrared radiation from said radiation emissive target to said first and second thermopiles, and

an attenuating neutral density filter, disposed in said energy path so as to attenuate the incident infrared radiation impinging upon only one of said thermopiles from said radiation emissive target without attenuating incident infrared radiation in said energy path due to infrared emissions by said ambient environment of said first and second thermopiles; and

means for processing said output electrical signals to determine said temperature of said radiation emissive target substantially independent of ambient temperature variations of said ambient environment.

5,159,937

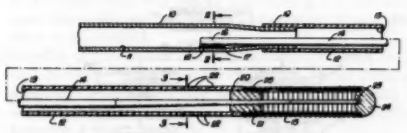
STEERABLE DILATATION CATHETER

William S. Tremulis, Redwood City, Calif., assignor to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Division of Ser. No. 528,860, May 25, 1990, Pat. No. 5,050,606, which is a continuation of Ser. No. 401,031, Aug. 31, 1989, Pat. No. 4,964,409, which is a continuation-in-part of Ser. No. 350,500, May 11, 1989, Pat. No. 4,953,553, which is a continuation-in-part of Ser. No. 103,109, Sep. 30, 1987, abandoned. This application Dec. 7, 1990, Ser. No. 624,207

Int. Cl.[5] A61B *5/00*

U.S. Cl. 128—772 **14 Claims**



1. A steerable dilatation catheter for angioplasty procedures, comprising:

a) a main tubular member having proximal and distal ends and an inner lumen extending therethrough to an axial opening in the distal end thereof;

b) a tubular extension having an inner lumen and being secured by the proximal end thereof to the main tubular member;

c) a solid elongated core member which has a proximal end secured within the inner lumen of the main tubular member, which extends out the axial opening in the distal end of the main tubular member, through the inner lumen of the tubular extension and out of the distal end of the tubular extension and which has a section extending through the axial opening with a transverse cross-sectional area substantially less than the cross-sectional area of the opening to facilitate the passage of inflation fluid therethrough;

d) an inflatable balloon having a proximal end and a distal end, with the proximal end secured to the distal end of the tubular extension and the distal end of the balloon secured to the core member passing therethrough; and

e) a flexible body disposed about a portion of the core member which extends out the distal end of the inflatable balloon.

5,159,938

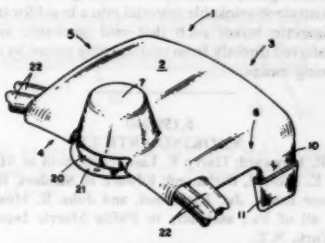
EYE SHIELD

Patrick E. Laughlin, 1191 Beechwood Dr., Green Bay, Wis. 54303

Filed Aug. 27, 1991, Ser. No. 750,521

Int. Cl.[5] A61F *9/00*

U.S. Cl. 128—858 **8 Claims**



1. An eye shield, in combination with an inhalation gas providing nose hood and comprising;

1) a substantially one piece eye shield structure of a semi-flexible clear plastic material,

2) said structure having a broad eye protecting central span,

3) said central span having a perimeter bounded on one side by a forehead edge, and bounded on the opposite side by a nose edge, and having a first side edge and a second side edge, and the first side edge and the second side edge span the distance between the forehead edge and the nose edge, one to each side of the central span to form a closed perimeter about the central span, and

4) the forehead edge is provided with an integral forehead contacting surface that is configured to rest comfortably on a human forehead, and

5) the side edges have projecting therefrom temple pieces, having free ends and which are configured so as to contact with and index to the temple area of a human head, and

6) the eye shield is fixedly secured to an inhalation gas providing nose hood by means of threaded fasteners that pass through the face shield and threadably engage the nose hood.

5,159,939

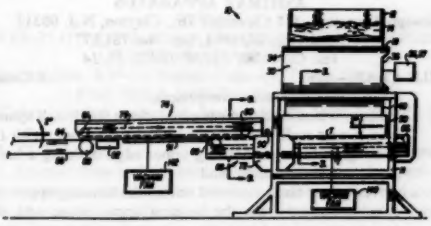
METHOD OF AND APPARATUS FOR DELIVERING TOBACCO TO A CIGARETTE MAKER

Clifford R. Marritt, Winston-Salem; Francis R. Oakley, Kernersville, and Gregory A. Holmes, Winston-Salem, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Oct. 19, 1990, Ser. No. 600,387

Int. Cl.[5] A24C *5/14, 5/18*

U.S. Cl. 131—84.2 **32 Claims**



1. Apparatus for delivering smokable material to a cigarette maker comprising:

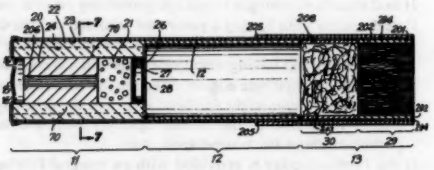
(a) means for holding a supply of the smokable material;

(b) means for metering the smokable material from the holding means to provide a metered smokable material;
(c) means for opening the metered smokable material and forming a falling shower of that smokable material;
(d) means for entraining the opened and falling smokable material in an airstream, the airstream having a velocity component in the direction of gravity; and
(e) means disposed beneath the entraining means for forming the entrained smokable material into a braid for transfer to a cigarette maker such that said smokable material is transferred directly from said opening means to said braid forming means.

5,159,940
SMOKING ARTICLE

Charles R. Hayward; Harry V. Lanzillotti, both of Midlothian; David E. Merrill, Richmond; Edward B. Sanders, Richmond; D. Bruce Losee, Jr., Richmond, and John R. Hearn, Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Jul. 22, 1988, Ser. No. 222,961
Int. Cl.[5] A24D *1/60, 1/02, 1/12, 1/18*
U.S. Cl. 131—194 **40 Claims**



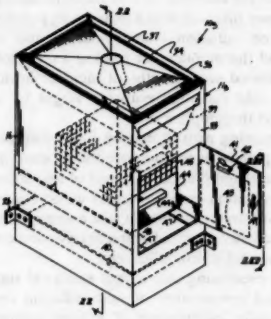
1. A smoking article having a mouth end and a distal end remote from said mouth end, said smoking article comprising:
an active element at said distal end in fluid communication with said mouth end, said active element comprising:
a non-combustible substantially cylindrical hollow ceramic sleeve having internal and external walls, and having a first end at said distal end and a second end closer to said mouth end,
a substantially cylindrical carbon-containing heat source contained in said sleeve adjacent said first end, said heat source having a fluid passage substantially through the center thereof, and
a flavor bed in said sleeve adjacent said second end thereof, in direct radiative and convective heat transfer relationship with said heat source; whereby:
when said heat source is ignited and air is drawn through said smoking article, air is heated as it passes through said fluid passage, said heated air flowing through said flavor bed, releasing a flavored aerosol, and carrying it to said mouth end.

5,159,941
ASHTRAY APPARATUS

Joseph Tornatore, 111 Clevenger Dr., Clayton, N.J. 08312

Filed Aug. 28, 1991, Ser. No. 751,177
Int. Cl.[5] A24F *13/18, 13/22, 19/14*
U.S. Cl. 131—236 **6 Claims**

1. An ashtray apparatus, comprising,
a housing, wherein the housing includes a front wall spaced from a rear wall, spaced side walls and a floor, with the housing including a housing upper edge defining a housing upper end opening, and
a convex cover hood mounted within the housing upper end opening spaced from the housing upper edge, with the convex cover hood including a central conduit projecting downwardly relative to the convex cover hood and medially thereof, wherein the central conduit includes an outwardly flared lower end, and
a support container positioned within the housing below the central conduit, and the support container including a

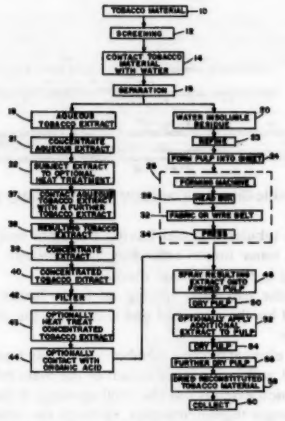


basket member positioned within the support container extending upwardly thereof.

5,159,942
PROCESS FOR PROVIDING SMOKABLE MATERIAL FOR A CIGARETTE

Paul A. Brinkley; Thomas W. Brown, both of Winston-Salem; Jack G. Flinchum, Jr., Pfafftown; Thomas A. Perfetti, Winston-Salem; James S. Thomasson, Statesville, and Harvey J. Young, Advance, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Jun. 4, 1991, Ser. No. 710,273
Int. Cl.[5] A24B *15/18*
U.S. Cl. 131—298 **31 Claims**



1. A process for providing a reconstituted tobacco material, the process comprising the steps of:
(a) extracting components from tobacco material using a solvent having an aqueous character thereby providing (i) an aqueous tobacco extract and (ii) a tobacco portion insoluble in the solvent;
(b) separating at least a portion of the aqueous tobacco extract from the insoluble tobacco portion;
(c) forming the insoluble tobacco portion into a predetermined shape;
(d) providing a further tobacco extract by treating a tobacco material under extraction conditions with ammonia;
(e) contacting the further tobacco extract with the aqueous

tobacco extract of step (b) thereby providing a resulting aqueous tobacco extract; and then

(f) contacting the insoluble tobacco portion of step (c) with the resulting aqueous extract of step (e) to provide a reconstituted tobacco material.

5,159,943

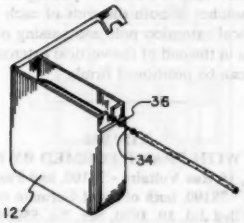
UNIFIED DENTAL FLOSS AND BRIDGE THREADER

Linda K. Richards, and Norvel D. Richards, both of 8094 Olney St., SE., Salem, Oreg. 97301

Filed Nov. 21, 1991, Ser. No. 795,391

Int. Cl.[5] A61C *15/00*

U.S. Cl. 132—321 **1 Claim**



1. A new and improved dental floss assembly comprising:

a plurality of preselected lengths of dental floss;

connection means interfixed between each of said plurality of preselected lengths of dental floss, said connection means comprising short lengths of thread fixedly secured to free ends of said plurality of preselected lengths of dental floss;

dispenser means for said dental floss, said dispenser means having a pivotally attached lid;

a spool forming a part of said dispenser means, said spool retaining and facilitating a dispensing of said dental floss;

an orifice provided in said lid for facilitating a dispensing of said dental floss, said orifice also having a cutter associated therewith for facilitating a severance of said dental floss when desired;

a plurality of granules of fluoride interspersed along each of said plurality of preselected lengths of dental floss, said granules of fluoride acting as an abrasive and being dissolvable to allow a coating of fluoride to be obtained between a user's teeth;

and

a plurality of small knots on said thread, thereby to facilitate both a gripping of said thread and a determination of where to sever said thread in order to obtain a single one of said plurality of preselected lengths of dental floss, said plurality of small knots including closely spaced-apart knots and further apart knots, said closely spaced-apart knots being medially positioned on said thread and being used to determine where to sever said thread with said cutter, and used further apart knots being positioned proximate said free ends of said dental floss and being utilizable to facilitate said gripping of said thread during an operational use of said dental floss by said user.

5,159,944

CIGARETTE

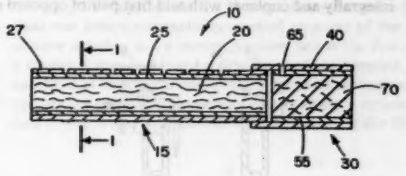
Barbara W. Arzonico, Lewisville; Alan B. Norman, Clemmons, and Thomas L. Gentry, Winston-Salem, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed May 24, 1990, Ser. No. 528,302

Int. Cl.[5] A24D *1/02*

U.S. Cl. 131—365 **20 Claims**

1. A cigarette comprising a smokable rod including smokable material contained in first and second circumscribing outer wrapping materials; the first wrapping material circumscribing the smokable filler material, and the second wrapping material circumscribing and overwrapping the first wrapping material; the first wrapping material including a cellulosic base web and carbonaceous material, and the second wrapping



material (i) having a cellulosic base web and inorganic filler material, and (ii) exhibiting an air permeability below about 8 CORESTA units.

5,159,945

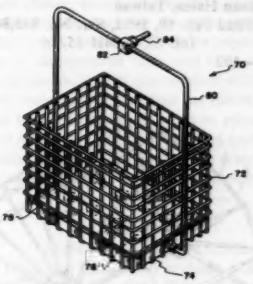
ULTRASONIC PARTS CLEANING APPARATUS

John H. Bannon, 4208 Crownfield Ct., Westlake Village, Calif. 91361

Division of Ser. No. 650,242, Feb. 4, 1991, Pat. No. 5,088,510. This application Dec. 12, 1991, Ser. No. 806,700

Int. Cl.[5] B08B *3/10*

U.S. Cl. 134—85 **1 Claim**



1. A parts container adapted to be submerged in a bath with a cleaning solution, said parts container to minimize ultrasonic energy losses plus allow usage of non-toxic cleaning solutions, said parts container comprising:

a wire mesh enclosing sidewall being open at the top and closed by a solid floor at the bottom; and

a plurality of ultrasonic transducer assemblies being mounted within said floor, all said transducer assemblies to be operatively driven simultaneously to emit a continuous stream of energy to affect cleaning of parts adapted to be located within said parts container.

5,159,946

OVER-FLOW TANK FOR A SEMICONDUCTOR WAFER WASHING APPARATUS

Aigo Selichiro, 3-15-13, Negishi,Daito-ku, Tokyo, Japan

Filed May 2, 1990, Ser. No. 517,833

Claims priority, application Japan, May 15, 1989, 1-55452[U]

Int. Cl.[5] B08B *3/04*

U.S. Cl. 134—182 **7 Claims**

1. An over-flow tank for use in a semiconductor wafer washing apparatus wherein clean air is forced over the tank to remove vapor formed therein, said over-flow tank comprising:

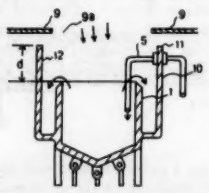
a bottom surface;

a first pair of opposed side walls having a first height;

a second pair of opposed side walls having the first height, wherein said bottom surface, said first pair of opposed side

walls, and said second pair of opposed side walls define a cavity;

means for guiding the clean air over the over-flow tank in a direction parallel to said first pair of opposed side walls, said means comprising a pair of vertical extensions formed integrally and coplanar with said first pair of opposed side



walls and each extending to a height greater than said first height; and

at least one washing tank disposed within said cavity and formed integrally with said bottom surface, wherein said at least one washing tank has a height no greater than said first height.

5,159,947

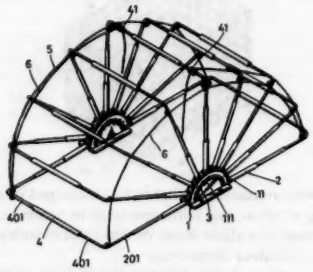
COLLAPSIBLE TENT FRAME

Ching-Pao Chuang, No. 128-18, Yu Che, Yu Che Li, Ma Tou Chen, and Jung-Tai Lin, No. 135, Po Ai Street, Chia Li Chen, both of Tainan Hsien, Taiwan

Filed Feb. 18, 1992, Ser. No. 835,843

Int. Cl.[5] E04H *15/36*

U.S. Cl. 135—102 **2 Claims**



1. A collapsible tent frame comprising;

two pole position bases for supporting the lower ends of two main frame poles, having respectively two semi-circular arms extending in parallel from one side to the opposite side, a semi-circular slot under each of said semi-circular arms for a bolt to pass through to screw with a wing nut, a semi-circular groove formed between two parallel walls under said semi-circular slots for the end of each main frame pole to stand therein;

a plurality of frame units to form the tent frame to support a tent cloth or canvas, shaped as reversed U, each frame unit consisting of two main frame poles, two vertical extension poles connected with said main frame poles, a horizontal frame tube, two horizontal extension poles connected with both sides of the frame tube to form the horizontal portion of each said frame unit to support the roof portion of the tent cloth, said main frame pole and the vertical extension pole forming one of the parallel portion of each said frame unit, each said vertical extension pole being connected with each horizontal extension pole by means of a collapsible hinge to enable both extensions poles connected in about a right angle, each said main frame pole having a sidewise through hole at the bottom portion for a bolt passing through said semi-circular slots in said pole position base to pass through to screw with a wing nut, and a position member extending to two opposite sides to closely contact the upper surfaces of said two parallel arms in said pole position base;

a plurality of collapsible hinges respectively having a middle annular projection and a two annular projection, said middle annular projection attached on the end of said horizontal extension pole and said two annular projection attached on the end of said vertical extention pole, both of said projections provided with a sidewise hole for a pin to pass through to combine both the projections together and thus also combine both said vertical and said horizontal extension pole together; and

two position ropes for holding all the frame units properly spaced apart from one another, passing through the semi-circular notches in both the ends of each horizontal and each vertical extension pole and passing over the central projection in the end of the vertical extension pole so that the rope can be positioned firmly.

5,159,948

TENT WITH FRAME FORMED BY HOOPS

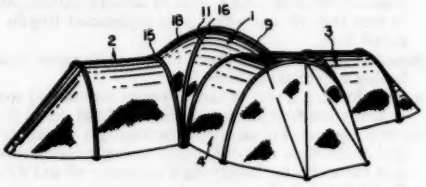
Alain Moreau, 16 Rue Voltaire - 78100, and Florent Baudin, 55 Rue Mareil - 78100, both of Saint Germain en Laye, France

Filed Jul. 10, 1990, Ser. No. 550,980

Claims priority, application France, Jul. 11, 1989, 89 08323

Int. Cl.[5] E04H *15/40*

U.S. Cl. 135—104 **18 Claims**



1. A tent having a central summit and formed of a stretched main canvas, comprising:

a base for a central tent having a polygonal shape with an even number of sides, and corners of said base including support means;

at least two identical continuous flexible diametrical hoops each having a pair of free ends for support by said corners of said base at diametrically opposite corners thereof by said support means, said two identical hoops at said central summit thereof defining with said base a central frame for said central tent, a center point of said base together with said central summit defining a central vertical axis of symmetry for said central tent passing through said center point and said summit;

at least four lateral vertical hoops, one for each side of said base, each having a pair of free ends and supported by said support means on a side joining two of said adjacent support means for positioning each of said lateral vertical hoops in a plane substantially parallel to said central vertical axis and substantially perpendicular to said base and passing through one of said sides of said polygon;

at least two lateral tents of the tunnel type connected with said central tent, each of said lateral tents being connected with one of said sides of said polygon and one of said lateral vertical hoops;

said canvas being stitched over said four lateral vertical hoops to form said central tent; and

means external of said central tent and connected therewith for supporting said canvas from said two identical continuous diametrical hoops.

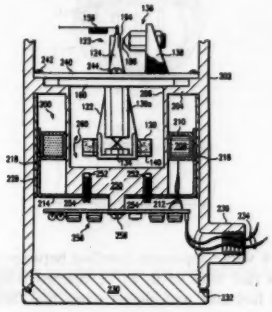
5,159,949
ELECTROPNEUMATIC POSITIONER

Robert C. Prescott, N. Marshfield; Donald C. Simpson, Norton; Philip H. Sanford, Walpole, and Howard W. Nudd, Foxboro, all of Mass., assignors to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 500,524, Mar. 28, 1990, Pat. No. 5,022,425, which is a division of Ser. No. 289,224, Dec. 23, 1988, Pat. No. 4,926,896. This application Jun. 10, 1991, Ser. No. 712,507

Int. Cl.[5] G05D *16/20*

U.S. Cl. 137—84 **53 Claims**



1. A process control system, comprising:

a transducer having a coil winding for generating a magnetic field responsive to an electrical input to said coil winding, a magnet for producing a pivotal movement in response to the thus generated magnetic field, and a flapper arm mounted with respect to said magnet to produce a movement of said flapper arm corresponding to the thus produced pivotal movement of said magnet;

a supply line adapted to have a pressurized gas therein, a nozzle connected to said supply line, said nozzle being fixed adjacent said flapper arm so that said movement of said flapper arm affects the passage of said pressurized gas through said nozzle and thereby changes the gas pressure of the pressurized gas in said supply line;

a valve actuator for setting a valve stem to a desired position responsive to the gas pressure in said supply line; and

a feedback system comprising a linkage connected to said valve stem such that said linkage moves in correspondence with movement of said valve stem, and a spring connected between said linkage and said flapper arm to modify the position of said flapper arm responsive to the position of said valve stem;

wherein said transducer further comprises:

at least one bearing attached to said magnet for allowing pivotal movement of the magnet about an axis extending through said magnet in response to said magnetic field; and

a bearing support structure to which said bearing is attached for suspending said magnet and said bearing within the space encompassed by said coil winding.

5,159,950
FOUNTAIN FAUCET

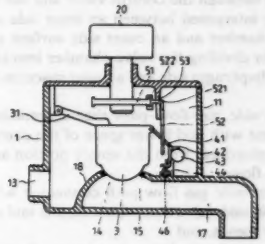
Wen-Chang Wang, No. 208-13, Shang Lun Tsun, Jen Te Hsiang,, Tainan Hsien

Filed Apr. 21, 1992, Ser. No. 871,507

Int. Cl.[5] F16K *15/18, 31/14, 31/24*

U.S. Cl. 137—390 **6 Claims**

1. A fountain faucet for automatically shutting off the water flow from a pipe comprising a housing defining a water chamber and having an inlet communicating the water chamber, an outlet communicating the water chamber through an opening, a buoyant closure member disposed in the water chamber and hinged at a first side thereof for a swinging movement between a closed position where flow through the opening to the outlet is blocked and an open position where the water chamber is in communication with the outlet, a float-rod having a first end mounted with a float and a second end hinged to a second side of the buoyant closure member opposite to the first side thereof to swing the float between a first position where the float and float-rod locate substantially parallel to a top of the buoyant closure member and a second position below the first position, a retaining means having a bracket member adapted to catch and hold at least a portion of the float in its second position, a coil spring biasing the retaining means along a rotating direction to catch and hold said at least a portion of the float in its



second position, with its bracket member, a control member operably movable between a first position to engage and retain the buoyant closure member in its closed position and a second position allowing the buoyant closure member to swing freely between its closed and open positions when the control member is out of engagement with said closure member and an actuating device shifting in combination with the movement of the control member to overcome the biasing force of the coil spring and turn the retaining means to release the float when the control member is in its first position and allowing the float to rise within the water chamber as the water level rise therein and maintain the closure member in its closed position.

5,159,951
MASS FLOW CONTROLLER

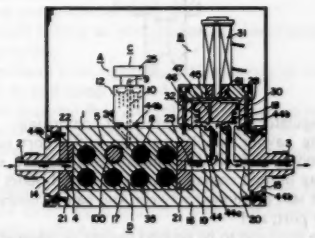
Hirofumi Ono, and Tatsuhiko Furukado, both of Shiga, Japan, assignors to Lintec Co., Ltd., Shiga, Japan

Division of Ser. No. 579,521, Sep. 10, 1990. This application Oct. 15, 1991, Ser. No. 776,026

Claims priority, application Japan, Sep. 26, 1989, 1-251606; Jan. 15, 1990, 2-6029

Int. Cl.[5] G05D *7/06*

U.S. Cl. 137—486 **3 Claims**



1. A mass flow controller comprising a main body including a bypass portion through which a large amount of gas is passed, a sensor portion through which gas flows at a small flow rate proportional to the flow rate of the gas passed through said bypass portion, a control valve portion for measuring the total flow rate of gas by measuring the flow rate in the sensor portion and controlling the flow rate of gas on the basis of a sensing signal from the sensor portion, and said

sensor portion and the control valve portion are mounted on said main body which contains said bypass portion, said control valve portion comprising:

a valve chamber,

a diaphragm that encloses and forms an upper surface of said valve chamber,

a control valve provided in the valve chamber which seats on a valve seat,

an elastic means for pressing and urging the control valve toward said diaphragm and away from said valve seat,

a driving means arranged above the diaphragm for pressing the control valve toward and onto said valve seat against the elastic force of said elastic means for controlling a spacing between the control valve and the valve seat;

an O-ring interposed between an inner side surface of the valve chamber and an outer side surface of the control valve for dividing the valve chamber into an upper space on the diaphragm side and a lower space on the valve seat side;

a primary-side gas flow path that communicates via said valve seat with said lower space of the control valve into which mixed gas from the sensor portion and the bypass portion flows;

a secondary-side gas flow path connected with said lower space via said valve seat which directs said gas flow to an exterior means, and

said control valve includes an aperture therein which connects said lower area of the control valve to the upper area between the control valve and the diaphragm.

5,159,952

REGULATOR FOR WATER BASE PAINT

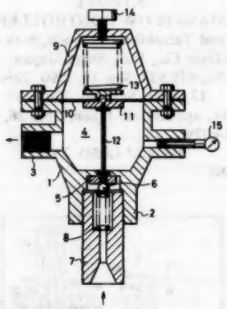
Yukihito Ono, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha and Nihon Gurei Kabushiki Kaisha, both of Tokyo, Japan

Filed Jun. 17, 1991, Ser. No. 716,470

Claims priority, application Japan, Jun. 29, 1990, 2-68592[U]

Int. Cl.[5] G05D *16/08*

U.S. Cl. 137—505.41 **2 Claims**



1. A regulator for water base paint comprising:

a casing having an inlet port, an outlet port and a paint chamber, said paint chamber being defined inside said casing in fluid communication with said outlet port;

a valve seat positioned between said paint chamber and said inlet port; and

a valve arranged to be pressed against or released from said valve seat depending on an internal pressure in said paint chamber, thereby maintaining the delivery pressure of the paint from said outlet port constant;

wherein one of said valve and said valve seat is made of a ceramic material and other of said valve and said valve seat is made of a sintered hard alloy and said ceramic material and sintered hard alloy comprise corrosion-resistant materials of different hardnesses.

5,159,953

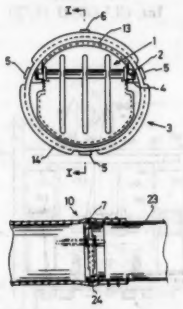
CHECK VALVE APPARATUS FOR FUEL TANK

Kyokuichi Sato, and Juichi Fujita, both of Okayama, Japan, assignors to OM Industrial Co., Ltd., Oakayama, Japan

Filed Sep. 11, 1991, Ser. No. 758,891

Int. Cl.[5] F16K *15/03*

U.S. Cl. 137—527.8 **6 Claims**



3. A check valve apparatus installed between a fuel supply spout and a fuel tank so as to be opened when fuel flows toward said fuel tank and closed when fuel flows back, said valve apparatus comprising:

a valve plate made of synthetic resin formed with rotating rod members as one body at a position displaced from a circle center point of said valve plate; and

a valve body made of synthetic resin having an annular shape and supporting an outer periphery of said valve plate, said valve body including retainer projections provided on two portions of an outer periphery of said valve body and bearing section on an inner periphery so as to correspond to said rotating rod members of said valve plate.

5,159,954

HINGED SAFETY-VALVE FOR LARGE DUCTS

Hans-Jürgen Janich, Beckum, Fed. Rep. of Germany, assignor to Mannesmann Aktiengsellshaft, Düsseldorf, Fed. Rep. of Germany

Filed Sep. 27, 1991, Ser. No. 767,264

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1990, 4030611

Int. Cl.[5] F16K *37/00*

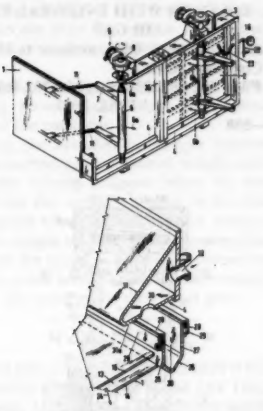
U.S. Cl. 137—557 **20 Claims**

18. A valve apparatus for a gas duct, the gas duct having a first duct chamber on a first side of the valve apparatus and the gas duct having a second duct chamber on a second side of the valve apparatus, said valve apparatus comprising:

a shutoff door, for being moveable within the gas duct, for sealing against a seal seat when in the closed position thereby separating the gas duct into the first duct chamber and the second duct chamber, and for shutting off gas flow between the first duct chamber and the second duct chamber; and

a body chamber formed within said shutoff door, said body chamber being substantially gas-tight and being separate from the first and second duct chambers, and said body chamber being configured for having a body pressure therein which body pressure is different from the pressure within the first duct chamber and also different from the pressure within the second duct chamber, said body cham-

ber having means for connection to a source for providing the different pressure within said body chamber, and said



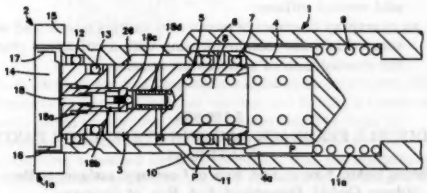
body chamber having means for connection to a pressure monitoring device.

5,159,955

COUPLING PART COMPRISING PRESSURE-REDUCING MEANS

Thure Ekman, Skövde, Sweden, assignor to Dart Engineering AG, Zug, Switzerland

Filed Jan. 17, 1991, Ser. No. 642,646
Claims priority, application Sweden, Jan. 17, 1990, 9000163
Int. Cl.[5] F16L *29/00*
U.S. Cl. 137—614.03 **17 Claims**



6. A coupling part constituting the male or female part in a quick coupling and compressing:

an inner, longitudinally displaceable unit positioned in an outer part of said coupling part, said inner unit being adapted in a starting, deactivated position thereof to confine the media pressure in a first chamber arranged in said outer part of the coupling part and in an actuated position said inner unit being adapted to open or keep open an access for media to a second chamber in said outer part of the coupling part;

pressure-reducing means actuable upon coupling together of the male and female parts and allowing for said coupling together even at high media pressures, said pressure-reducing means comprising a lead-off channel for media pressure and a shut-off element positioned in said channel, said shut-off element being actuable by the end face of the other coupling part in said coupling through an actuation member which also constitutes a part of said pressure-reducing means, said actuation member being designed sealed-off or positioned in said coupling part in order to prevent lead-off media from reaching the end face of the coupling part;

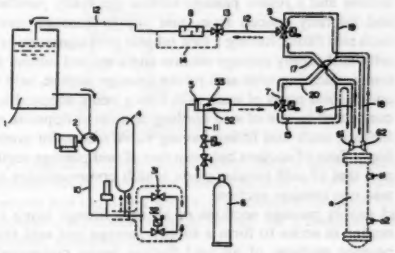
wherein said lead-off channel on both sides of said shut-off element is connectable to said first and said second chambers and wherein, upon actuation of the pressure-reducing means, said first and said second chambers form two communicating chambers through lateral connections in said inner unit, said lead-off channel and the opened shut-off element wherein accompanying decompression of the pressure in said first chamber facilitates the longitudinal displacement of the inner unit, as a result of which it is possible to obtain leakage-free connection of the coupling parts in the presence of any media pressure.

5,159,956

HERMETICALLY SEALED WATER PIPE CLEANING DEVICE

Yoshikuni Kurihara, 7-12, Goryo-machi, Higashimatsuyama-shi, Saitama-ken, Japan

Continuation-in-part of Ser. No. 323,418, Mar. 14, 1989, abandoned. This application Apr. 27, 1990, Ser. No. 516,121
Claims priority, application Japan, Mar. 16, 1988, 63-34874
Int. Cl.[5] F28G *9/00*
U.S. Cl. 137—624.13 **4 Claims**



1. A water pipe cleaning system comprising:

a cleaning water storage tank;

pump means having an inlet connected to said storage tank and an outlet;

a high pressure flow regulating valve having an inlet connected to said pump outlet;

a solenoid operated flow control valve connected in parallel with said flow regulating valve and means for operating said flow control valve intermittently between open and closed positions;

an accumulator connected to said pump outlet for absorbing pressure shock when said flow control is closed, so that said pump, valves and accumulator cooperate to produce a flow of cleaning water having a pulsating high pressure therein;

a gas-liquid mixer downstream of said valves for introducing pressurized gas into said flow of cleaning water; and

means for connecting said gas-liquid mixer to at least one pipe to be cleaned so that the pulsating flow of said cleaning water through said at least one pipe effects cleaning of the inside thereof.

5,159,957

COOLANT DISTRIBUTING AND FLOW CONTROL APPARATUS FOR MAINTAINING A CONSTANT TEMPERATURE-CONTROLLABLE REGION OF AN INJECTION MOLDING MACHINE

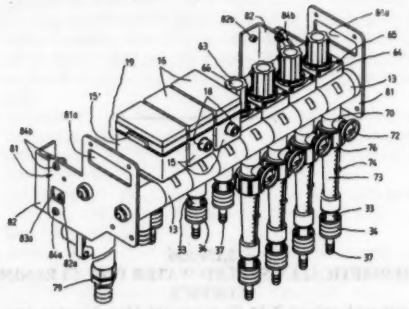
Karl Hehl, Arthur-Hehl-Str. 32, D-7298 Lossburg 1, Fed. Rep. of Germany

Filed Aug. 19, 1991, Ser. No. 747,148

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1990, 4027791

Int. Cl.[5] B29C *45/72*

U.S. Cl. 137—883 **17 Claims**



17. In a coolant distributing and flow control apparatus for use with an injection molding machine having a plurality of temperature-controllable regions and provided with a plurality of cooling circuits for conducting a coolant through respective ones of said regions, said apparatus comprising:

a series of fittings closely adjoining and tightly connected to each other; each said fitting defining a supply passage section and a return passage section generally parallel to and laterally spaced from said supply passage section; each said fitting having a first tubular port communicating with said supply passage section and a second tubular port communicating with said return passage section, said first and second ports of each said fitting being adapted to be connected to one of said cooling circuits at opposite ends thereof; each said fitting having valve means for controlling a flow of coolant between one of said passage sections and that of said tubular ports which communicates with said one passage section;

said supply passage sections of all said fittings being connected in series to form a supply passage and said return passage sections of all said fittings being connected in series to form a return passage;

the improvement wherein

each said fitting has a valve passage extending between and crossing said supply and return passage sections at right angles thereto and a first portion communicating with said one passage section and a second portion communicating with that of said tubular ports which communicates with said one passage section; said tubular ports extending parallel to one another;

said valve means comprising a plurality of rotary flow control valves, each contained in one of said valve passages between said first and second portions thereof; each rotary flow control valve being operable to control a flow rate in said valve passage; said valve means further comprising a plurality of valve actuators each being detachably mounted on one of said fittings and being operatively connected to the rotary valve provided in said one fitting; and

further comprising a swiveling disk for mounting the coolant distributing and flow control apparatus on an injection molding machine for a pivotal movement thereon from a normal position in which said tubular ports are vertically oriented, to an inclined position in which said tubular ports are oriented at an acute angle to the vertical.

5,159,958

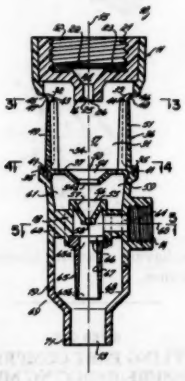
CHEMICAL EDUCTOR WITH INTEGRAL ELONGATED AIR GAP

William F. Sand, Cincinnati, Ohio, assignor to Hydro Systems Company, Cincinnati, Ohio

Filed Jul. 18, 1991, Ser. No. 732,469

Int. Cl.[5] F16K *1/00*

U.S. Cl. 137—888 **7 Claims**



1. A chemical eductor with integral air gap comprising a water inlet and a first nozzle;

an elongated air gap chamber between said first nozzle and a second nozzle having a spray shield disc said disc having an axially aligned opening and at least one slot;

a venturi nozzle downstream of said disc and

a venturi diffuser tube downstream of said venturi nozzle;

a chemical inlet into an area between said venturi nozzle and said venturi diffuser;

an overspray chamber between said venturi nozzle and said spray shield disc communicating with a collection chamber downstream of said venturi nozzle.

5,159,959

DOUBLE FEEDBACK PACKING SYSTEM FOR PASTY MATERIAL

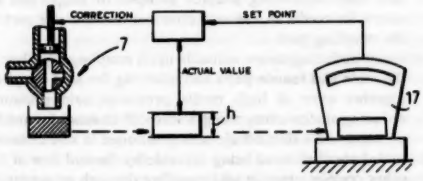
Jürgen Böhm, Kaarst, Fed. Rep. of Germany, assignor to Benz & Hilgers GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Nov. 16, 1990, Ser. No. 614,909

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1989, 3938220

Int. Cl.[5] B65B *1/04, 3/04*

U.S. Cl. 141—1 **6 Claims**



1. A method of operating a packaging system wherein a pasty material is dosed as portions into individual containers to form individual packages, the method comprising the steps of:

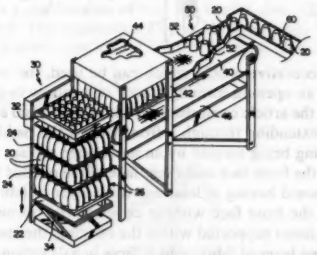
a) measuring at least one dimension of the doses int he containers and thereby producing actual-value outputs corresponding to the volumes of the respective doses;
b) comparing the actual-value volume outputs with a set point corresponding to a desired volume;
c) altering the dosing of the portions when the volume outputs deviate from the volume set point so as to make the volume outputs generally equal to the volume set point;
d) weighing the packages after forming the packages and producing actual-value outputs corresponding to the weights of the packages;
e) comparing the actual-value weight outputs with a set point corresponding to a desired weight; and
f) altering the volume set point when the weight outputs deviate from the weight set point by increasing the volume set point when the actual-value weight outputs are below the weight set point and decreasing the volume set point when the actual-value weight outputs are above the weight set point until the actual-value weight outputs are generally the same as the weight set point.

5,159,960

HANDLING SYSTEM FOR LIGHTWEIGHT CONTAINERS INCLUDING BALLAST DISPENSER

Frank G. Pringle, Medford, N.J., assignor to R&D Innovators, Inc., Medford, N.J.

Filed Oct. 11, 1990, Ser. No. 595,585
Int. Cl.[5] B65B *3/04*
U.S. Cl. 141—1 **20 Claims**



1. A method for handling lightweight open containers, the containers defining an internal volume and having a center of gravity when empty, the method comprising the steps of:
arranging the containers in an upright orientation;
dispensing a limited quantity of ballast into the containers, the quantity being substantially less than the internal volume, whereby the containers and the ballast therein have a center of gravity substantially lower than the center of gravity of the containers when empty;
moving the containers along a conveyor, the ballast tending to prevent the containers from falling over while being moved along the conveyor.

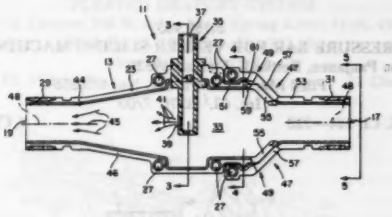
5,159,961

INFLATOR/DEFLATOR ACCESSORY FOR AIR COMPRESSOR

Mark E. Snetting; Steven A. Anderson, both of Eden Prairie, Minn.; Scott D. Price, Pylesville, and David L. Sutton, Forest Hill, both of Md., assignors to Black & Decker Inc., Newark, Del.

Filed Nov. 2, 1990, Ser. No. 608,516
Int. Cl.[5] F04F *5/44*; B65B *3/14*
U.S. Cl. 141—10 **31 Claims**

13. A method for inflating and deflating a low pressure inflatable article with a device comprising a conduit having an intake, an outtake, an injector having an opening external to the conduit and a small orifice within a central passageway of the conduit and directed toward the outtake, and an air inlet, the method comprising the steps for inflating the article of:
connecting the outtake to a fill valve of the article;
generating a small volume high velocity, low pressure air stream from the orifice toward the outtake; and



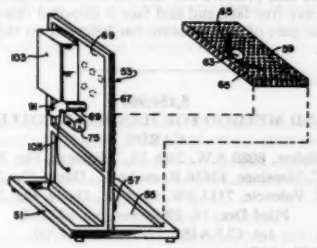
generating a high volume low pressure air stream which is taken in through the intake and inlet, is transmitted through the passageway and is expelled into the article through the outtake.

5,159,962

CONTAINER FILLING MACHINE, PARTICULARLY FOR CONCENTRATED LIQUID PIGMENT

Warren A. Dow, St. Louis, Mo., assignor to Harcros Pigments, Inc., East St. Louis, Ill.

Filed Apr. 5, 1991, Ser. No. 681,140
Int. Cl.[5] B65B *3/04*
U.S. Cl. 141—98 **15 Claims**



1. A container filling device comprising a liquid source, a dispensing nozzle having an inside diameter, a valve between the nozzle and the liquid source, a mechanical actuator for the valve, and a horizontal support surface for a container below the nozzle, characterized by
(a) barrier means for separating the nozzle and the support surface on a front side of the barrier means from the liquid source and the valve actuator on a rear side of the barrier means;
(b) positioning means in the support surface for positioning a container below the nozzle and opening means in the support surface for permitting liquid to pass through the support means when a container is not positioned below the nozzle, the opening means having a diameter at least as large as the inner diameter of the nozzle;
(c) the nozzle comprising an outlet tube and a plurality of nozzle heads, each of the plurality of nozzle heads comprising quick-connect coupling means for attaching the nozzle head to the outlet tube, the outlet tube being fixed in height with respect to the horizontal support surface, each of the plurality of nozzle heads being of different lengths to provide a nozzle outlet spaced a desired distance above containers of different heights;
(d) a liquid depth sensor vertically adjustable with respect to the nozzle for accommodating containers of different heights; and
(e) the liquid source comprising a container separate from

the device, a pulsating pump for drawing liquid from the container, and a pulse dampening means between the pump and the valve, the pulse dampening means comprising a length of flexible tubing for carrying the liquid, a jacket around and spaced from the length of tubing, and means for controlling pressure in the jacket.

5,159,963

PRESSURE BAR FOR VENEER SLICING MACHINES

Alpo Paajanen, Reitkalli, Finland 49520

Filed Mar. 26, 1991, Ser. No. 675,555
Int. Cl.[5] B27C *7/00*
U.S. Cl. 144—213 6 Claims

3. A veneer slicing machine comprising:
a veneer cutting knife;
a pressure bar spaced from the knife for creating the pressure on the wood to be sliced, said pressure bar having a face for contacting the wood, the region of the pressure bar before said pressure bar face on its entrace side having a concave free face and said face is disposed raised relative to the part of said pressure bar before it on the entrance side.

5,159,964

TOOL AND METHOD FOR HANDLING COLLECTABLE CARDS

Paul N. Baker, 8080 S.W. 24th Pl., Miramar, Fla. 33025; Michael C. Messineo, 13650 Roanoke St., Davie, Fla. 33325, and Milo J. Valencic, 7111 SW. 33rd Ct., Davie, Fla. 33314

Filed Dec. 14, 1990, Ser. No. 627,848
Int. Cl.[5] A45C *11/18;* B25B *7/00*
U.S. Cl. 150—147 7 Claims

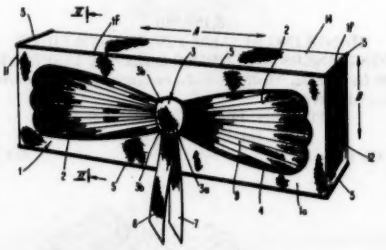
1. A tool for inserting a collectible card into an envelope having an open edge, without damaging the card comprises, a flexible sheet folded over to include means to create two flexible panels having free ends resiliently spaced apart and a common hinged end, the width of the said free ends being shorter than that of the open edge of the envelope, whereby a grasping of said panels with the card therebetween results in gripping of the card for insertion into the envelope, and a subsequent release of the panels releases the card so that the card remains in the envelope while the tool is withdrawn.

5,159,965

DECORATIVE ARTICLE SUCH AS A CORNICE, VALANCE OR LAMBREQUIN

Maria J. Roy, 6323 Merle Pl., Alexandria, Va. 22312, and Cornelius B. Cohen, Jr., 3809 13th St., NW., Washington, D.C. 20011

Filed Sep. 26, 1990, Ser. No. 588,539
Int. Cl.[5] E06B *9/00*
U.S. Cl. 160—38 19 Claims



1. A decorative article which can be used, for instance, to decorate an opening forming a door or window in a wall of a building, the article comprising a padded board and at least one opening extending through a front face of the padded board, the opening being formed by an inner edge surface extending between the front face and a rear face of the padded board, the padded board having at least one front layer of fabric extending over the front face without covering the opening, and at least one insert supported within the opening, the insert having at least one layer of fabric which faces in a direction extending from the rear face toward the front face of the padded board.

5,159,966

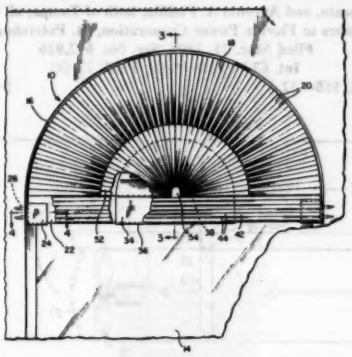
FAN-TYPE BLIND FOR SEMICIRCULAR ARCHED WINDOW

Ron Fleishman, and Lorraine Fleishman, both of 1225 Tamiami Trail, Port Charlotte, Fla. 33953

Filed Aug. 30, 1990, Ser. No. 575,827
Int. Cl.[5] E06B *9/06*
U.S. Cl. 160—84.1 7 Claims

1. In combination with a substantially semicircular window having a straight bottom edge, a blind comprising a fan-shaped radially pleated member of semi-rigid, shape-sustaining material and having opposing end pleats which are aligned to form an elongated, substantially straight bottom edge, a horizontally disposed one-piece, substantially straight, stationary mounting rail along the bottom edge of said member, the bottom edge of said member being secured to said mounting rail for rigidifying said member and maintaining said member in a fan-shaped configuration and in stationary aligned registry with said window, bracket means for supporting said mounting rail at the bottom edge of the window, said mounting rail including means along an upper edge thereof supportingly connected to horizontally aligned end pleats on said pleated member, and means on said rail exerting inward pressure on opposed sur-

faces of a central bottom portion of said pleated member to rigidify the member and to enable radial adjustment of the



pleats to accommodate variations in the configuration of the window.

5,159,967

IMPROVEMENTS IN AND RELATING TO ROLLER DOORS

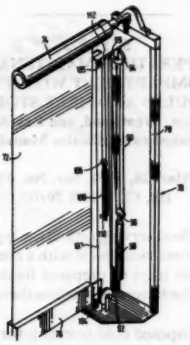
Paul Ashley, and John U. Chapman, both of Carlisle, England, assignors to Clark Door Limited, Carlisle, England

Continuation of Ser. No. 532,750, Nov. 30, 1989, abandoned, which is a continuation of Ser. No. 61,098, Jun. 12, 1987, abandoned. This application May 8, 1991, Ser. No. 700,048

Claims priority, application United Kingdom, Jan. 17, 1987, 8700987

Int. Cl.[5] A47G *5/02*

U.S. Cl. 160—265 **9 Claims**



1. A roller door assembly comprising:

a roller door having a substantially horizontal roller and bottom edge, motor means for driving the roller, means for tensioning said roller door, wherein a load is applied to said bottom edge of said roller door and means for counterbalancing the weight of the door, wherein a load is applied to said roller, the loads exerted by both said means being dependent on the amount of door off the roller and wherein the counterbalancing means comprises a drum attached to one end of the door roller, a wire on the drum that passes under a movable pulley and up to a fixed point, the wire rolling onto the drum in the opposite direction to that which the door rolls onto its roller, and means for compensating variations in the required counterbalancing force comprising spring means connected between the door and a fixed point whereby when the door is open the spring is taut and when the door is closed the spring is slack.

5,159,968

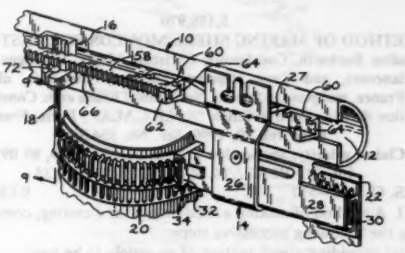
PLEATED DRAPERY SYSTEM

Jack M. Lawson, 346 N. Arbor View, Spring Arbor, Mich. 49283

Filed Oct. 7, 1991, Ser. No. 772,150

Int. Cl.[5] A47H *13/14*

U.S. Cl. 160—348 **18 Claims**



1. In a drapery hanging system for "S" pleated drapery, in combination, an elongated traverse rod, a track defined on said rod, a plurality of drapery carriers slidably guided within said track, an elongated flexible tension connector interconnecting adjacent carriers, spaced abutments defined on said connector along the length thereof and abutment engaging detents defined upon said carriers adapted to releasably engage selected abutments to permit adjustable spacing between adjacent carriers upon tensioning of said connector.

5,159,969

DEVICE FOR THE CONTINUOUS CASTING OF THIN METAL STRIPS BETWEEN TWO ROLLS

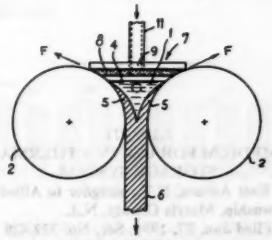
Michel M. Larreco, Metz; Jacques M. Spiquel, Montigny-Les-Metz, and Herve Tavernier, Vandoeuvre, all of France, assignors to Usinor Sacilor, Puteaux, France

Filed Nov. 20, 1990, Ser. No. 615,787

Claims priority, application France, Nov. 22, 1989, 89 15340

Int. Cl.[5] B22D *11/06, 11/10*

U.S. Cl. 164—415 **3 Claims**



1. A device for the continuous casting of thin metal strips between two rotatable spaced parallel rolls comprising:

side walls for retaining liquid metal at ends of said rolls and defining with said rolls a casting space for the liquid metal which liquid metal has a surface defining a meniscus;

a flat cover disposed above said casting space and above but in the immediate vicinity of the location of the meniscus so as to constitute a thermal screen which is so dimensioned as to cover the whole of the surface of the liquid metal;

a refractory lining provided on the side of said cover which

faces toward the liquid metal, said cover being in supported relation to said two rolls; and

means in said cover for injecting a neutral gas at a boosted pressure in the space between the meniscus and said refractory lining, the boosted pressure being such as to constitute a cushion interposed between said rolls and said cover for supporting said cover.

5,159,970

METHOD OF MAKING SHELL MOULDS FOR CASTING

Nadine Burkarth, Courbevoie; Christian Marty, Boulogne Billancourt, and Yvan Rappart, Fontenay-Sous-Bois, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.", Paris, France

Filed Jul. 20, 1990, Ser. No. 554,399

Claims priority, application France, Jul. 20, 1989, 89 09760

Int. Cl.[5] B22C *1/00, 9/04;* **B28B** *1/38, 7/36*

U.S. Cl. 164—517 **9 Claims**

1. A method of making a shell-mould for a casting, comprising the following successive steps:

(a) providing a wax pattern of an article to be cast;

(b) depositing an adhesion agent on said wax pattern;

(c) depositing thereon a layer of ceramic suspension from a fluid slip;

(d) drying said pattern after said deposition step (c);

(e) depositing a further layer of ceramic suspension on said pattern from said fluid slip;

(f) depositing ceramic particles in stucco form on said pattern following step (e);

(g) drying said pattern after said deposition step (f);

(h) repeating steps (e) to (g) to obtain desired mould characteristics for a particular application of said shell mould; and

(i) heat treating said shell-mould thus formed on said pattern to bake and consolidate said shell-mould by sintering and to dispose of said pattern; wherein said adhesion agent deposited on said pattern in step (b) comprises a 3% solution of an amino-silane in a solvent consisting of a mixture of ethanol and ethyl acetate in proportions such that each constitutes from 25% to 75% of said solvent, to thus provide for improved adhesion of said layer of said ceramic suspension to said wax pattern and thus avoid subsequent decoherence of said shell-mould from said wax pattern.

5,159,971

COOLING MEDIUM FOR USE IN A THERMAL ENERGY STORAGE SYSTEM

Chien C. Li, East Aurora, N.Y., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 27, 1991, Ser. No. 722,428

Int. Cl.[5] F28D *20/00*

U.S. Cl. 165—10 **19 Claims**

1. In a thermal energy storage system having a crystallizer compartment containing a clathrate forming cooling medium, a means for circulating the cooling medium through a heat exchanger and a means for lowering the temperature in said crystallizer compartment; the improvement comprising:

using as said clathrate forming cooling medium a mixture comprising water, 1-fluoro-1,1-dichloroethane and a surfactant selected from the group consisting of DRSC ®, EMPHOS PS-21A ®, MAPHOS L13 ®.

5,159,972

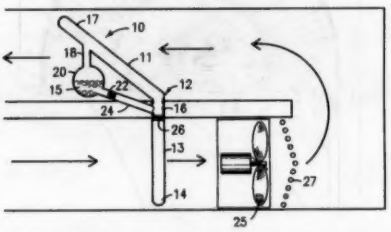
CONTROLLABLE HEAT PIPES FOR THERMAL ENERGY TRANSFER

Fred S. Gunnerson, Oviedo; F. Dave Sanderlin, Lakeland; Joy R. Iurato, and Antonio A. Padilla, both of Tampa, all of Fla., assignors to Florida Power Corporation, St. Petersburg, Fla.

Filed Mar. 21, 1991, Ser. No. 672,926

Int. Cl.[5] F28D *15/02;* **F28F** *27/00*

U.S. Cl. 165—32 **5 Claims**



1. In a controllable heat pipe system with a condenser region and an evaporator region at opposite ends and a working fluid sealed within the system, the improvement comprising,

a first channel within the heat pipe system leading from the evaporator region and being at about a twenty degree angle from a contiguous second channel within the heat pipe system leading from the first channel to the condenser region,

a third channel within the heat pipe system leading from the condenser region to a reservoir spaced apart from the condenser and evaporator regions, the reservoir used for storing the working fluid,

a fourth channel connecting the reservoir to the first channel, and

a flow control device located in at least one channel between the reservoir and either the condenser region or the evaporator region.

5,159,973

DUAL TEMPERATURE MAINTENANCE FOOD SERVING COMPARTMENT WITH PRE-COOLED COOLING MODULES AND HEAT STORAGE PELLETS

James Q. Pennington, Brentwood, and Ray A. Story, Nashville, both of Tenn., assignors to Plastics Manufacturing Co., Dallas, Tex.

Filed Mar. 28, 1991, Ser. No. 676,979

Int. Cl.[5] F25B *29/00*

U.S. Cl. 165—48.1 **8 Claims**

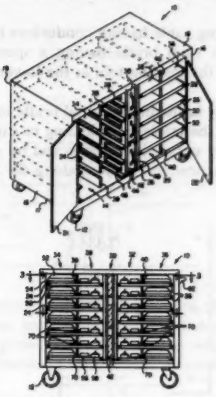
1. An improved food serving cart of the type having a generally rectangular geometrical shape with a compartment therein for holding multiple trays of prepared foods having both hot and cold food and/or beverage portions thereon, said improvement comprising:

(a) a vertically disposed cold reservoir for replaceably holding non-mechanical pre-cooled cooling modules; said vertically disposed cold reservoir dividing said compartment into a plurality of sub-compartments, each said sub-compartment having a cold zone contiguous to said cold reservoir and a hot zone spaced from said cold reservoir by said cold zone;

(b) a plurality of non-mechanical cooling modules in said cold reservoir;

(c) multiple food tray holding racks attached inside said cart in at least one of said sub-compartments in a vertical column horizontally adjacent to and in thermal communication with said vertically disposed cold reservoir such that a first portion of said horizontal racks is in close proximity to said cooling modules and within said cold zone, and a second portion of said horizontal racks is

spatially separated from said cold reservoir and is positioned within said hot zone, and



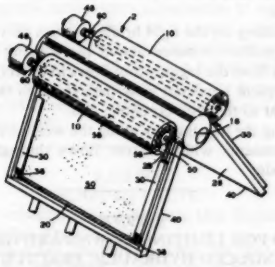
(d) a plurality of heat storage pellets disposed within said hot zone and displaced spatially from said cold zone.

5,159,974

STEAM CONDENSER WITH ARTICULATED ELECTRICALLY HEATED BLANKETS OR PANELS

Sidney P. Victory, Jr., Katy, Tex., assignor to Hudson Products Corporation, Houston, Tex.

Filed Jan. 6, 1992, Ser. No. 817,196
Int. Cl.[5] F01P *7/10*; F28B *11/00*
U.S. Cl. 165—96 **13 Claims**



8. A steam condenser arrangement with temperature regulating apparatus comprising:

a condenser having an exposed surface with an upper portion and a lower portion for allowing outside air to come into contact with the condenser;

heating control means connected to the condenser for regulating the temperature of the condenser;

mounting means connected to the condenser for positioning the heating control means over the exposed surface of the condenser in one of a covered, uncovered, and partially covered position;

motor means connected to the condenser for powering the heating control means into the covered, uncovered, and partially covered position; and

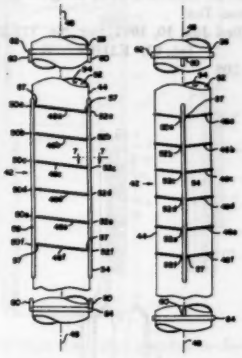
electrical means connected to the motor means and the heating control means for carrying electrical current to the heating control means for regulating the temperature of the condenser.

5,159,975

UNIT TO ENHANCE HEAT TRANSFER THROUGH HEAT EXCHANGER TUBE

Guy R. Murphy, 22W202 Foster Ave., Medinah, Ill. 60157

Filed Feb. 7, 1992, Ser. No. 832,318
Int. Cl.[5] F28B *9/08*
U.S. Cl. 165—110 **8 Claims**



1. A unit particularly adapted to increase the rate of heat transfer through a vertically positioned tube in a condenser-type heat exchanger, said unit comprising:

a series of spaced apart, arcuate shaped, wire-like elements, said elements positioned substantially parallel and on an angle with respect to a vertical axis of said tube to form a set of element low points, and

a conduit riser joined to said set of element low points,

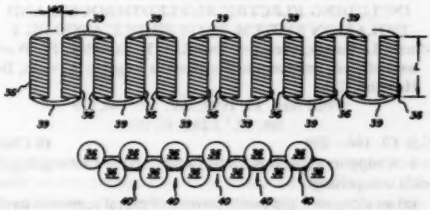
wherein during use said elements of said unit snugly engage said tube to form a leak resistant fit therewith, and said unit increases said rate of heat transfer from a high temperature medium condensing on and then flowing down said tube by said unit reducing the thickness of said flow while said elements cover only a minimal area of said tube.

5,159,976

HEAT TRANSFER DEVICE

Michael D. Virtue, Henderson, Ky., assignor to Indiana Tube Corporation, Evansville, Ind.

Filed May 20, 1991, Ser. No. 702,328
Int. Cl.[5] F28F *9/26*
U.S. Cl. 165—144 **4 Claims**



1. A heat transfer device comprising, in combination, a plurality of rows of interconnected helical coils, each of said rows of interconnected helical coils comprising a plurality of spaced interconnected helical coils to form gaps between adjacent helical coils, each row of helical coils having the helical coils thereof disposed in the gaps formed between the helical coils in adjacent rows to form a compact heat transfer device, each of said helical coils being formed by a continuous tube with substantial spacing between each coil turn, a fin attached

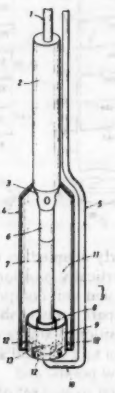
to the continuous tube and extending from each coil turn in the tube towards an adjacent coil turn to provide an air space between adjacent coils.

5,159,977

ELECTRICAL SUBMERSIBLE PUMP FOR LIFTING HEAVY OILS

George J. Zabaras, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 10, 1991, Ser. No. 712,280
Int. Cl.[5] E21B *43/00*
U.S. Cl. 166—105 **14 Claims**



1. An electrical submersible pump for producing viscous crude oil from a producing wellbore comprising:
a) a pump section;
b) a pump inlet at the lower end of the pump;
c) a motor located below the pump which drives the pump;
d) a shroud surrounding the pump inlet and the motor defining an annular flow path between the inside of the shroud and the motor from a shroud inlet at the bottom to the pump inlet;
e) a water conduit for conducting water from the surface to the shroud inlet; and
f) a means to direct a portion of the water from the conduit to the annular flow path adjacent to the motor.

5,159,978

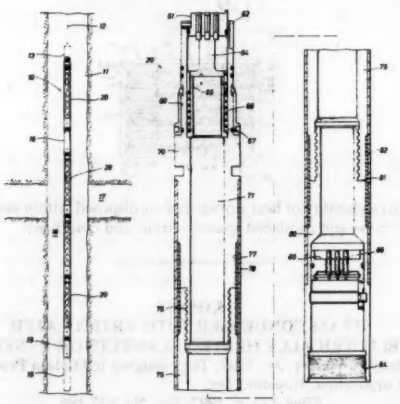
CONNECTING APPARATUS FOR LOGGING TOOLS INCLUDING ELECTRICAL FEEDTHROUGH AND ISOLATION SYSTEM WITH BRIDLE ASSEMBLY

Martin L. Tomek, Houston, and Kirk K. Stradley, Ft. Worth, both of Tex., assignors to Halliburton Logging Services, Inc., Houston, Tex.

Filed Aug. 13, 1991, Ser. No. 744,139
Int. Cl.[5] E21B *49/00*
U.S. Cl. 166—250 **10 Claims**

1. A support apparatus for use with current emitting logging tools comprising:
(a) an elongate rigid bridle formed of plural segments having a length of approximately fifteen feet per segment having an upper end cable head assembly for connection to a logging cable and a lower end for connection to a logging tool sonde having current emitting means therewith;
(b) a current receiving electrode positioned along said bridle;
(c) cooperative means extending along and interiorly of said bridle to pride signal communications from said cable head assembly to the logging tool sonde; and
(d) electrical insulation means preventing current flow along said bridle other than through said cooperative means.

9. A method of connecting a current emitting logging tool for logging in a well borehole wherein the method comprises the steps of:
(a) on a logging cable having conductors therein, attaching an elongate rigid bridle having a specified length and supporting the logging tool at the lower end of the rigid bridle;
(b) electrically insulating the rigid bridle to prevent current flow along the bridle by insulating its exposed surfaces to substantially cover the surfaces and by placing electrical insulation at spaced locations along the length thereof to



prevent lengthwise current flow, said rigid bridle comprising plural lengthwise segments provided with interconnecting threads, and covering said threads with an electrical insulator to prevent current flow through the threads;
(c) positioning on the rigid bridle a return current electrode at a specified distance above the logging tool so that current from the logging tool flows to the return electrode to complete a current flow path through the formations adjacent to the well borehole; and
(d) moving the logging tool along the well borehole to make measurements while current flows through the return electrode.

5,159,979

METHOD FOR LIMITING DOWNWARD GROWTH OF INDUCED HYDRAULIC FRACTURES

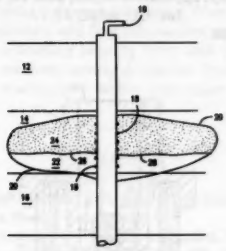
Alfred R. Jennings, Jr., Plano, Tex., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Oct. 1, 1991, Ser. No. 769,274
Int. Cl.[5] E21B *43/267*
U.S. Cl. 166—280 **4 Claims**

1. A method for limiting a downward growth of one or more vertically induced fractures in a subterranean formation during a fracturing treatment comprising:
a) introducing a first fracturing fluid into said formation and into at least one fracture formed therein where said first fracturing fluid is of a known density and contains a delayed cross-linking gel composition with internal gel breakers sufficient to form a temporary viscous gel in a lower portion of said fracture;
b) introducing a second fracturing fluid into said fracture having a density less than that of said first fracturing fluid and which further contains a proppant therein;
c) continuing the introduction of said second fracturing into the fracture thereby displacing the first fracturing fluid

into a lower portion of said fracture whereby said first fracturing fluid forms a highly viscous gel; and

d) allowing said first fracturing fluid to break faster than said second fracturing fluid containing said proppant which



causes the lower part of the fracture to close while propping an upper part of said fracture thereby limiting the downward growth of said fracture while substantially minimizing fracture intrusion into an underlying zone.

5,159,980

WELL COMPLETION AND REMEDIAL METHODS UTILIZING RUBBER LATEX COMPOSITIONS

David D. Onan, Lawton; Garland W. Davis, Comanche, and Roger S. Cromwell, Walters, all of Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Jun. 27, 1991, Ser. No. 722,045

Int. Cl.[5] E21B *33/14*

U.S. Cl. 166—294 **15 Claims**

1. A method of forming a temporary or permanent plug or seal in a well bore or in one or more subterranean formations penetrated by the well bore comprising the steps of:

(a) placing a vulcanizable rubber latex composition in said one or more subterranean formations or in said well bore at a desired location therein; and

(b) allowing said rubber latex composition to vulcanize and thereby form a solid rubber plug or seal therein wherein said vulcanizable rubber latex composition is comprised of an aqueous suspension of rubber, a vulcanizing agent and a vulcanizing activator selected from the group consisting of fatty acids, metallic oxide compounds and mixtures of such compounds.

5,159,981

FLAPPER VALVE

Nam V. Le, Lewisville, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Jun. 20, 1991, Ser. No. 718,214

Int. Cl.[5] E21B *34/06*; F16K *15/03*

U.S. Cl. 166—325 **2 Claims**

1. A flapper valve comprising:

(a) a cylindrical housing having a wall, said wall having at least one longitudinal hole therein;

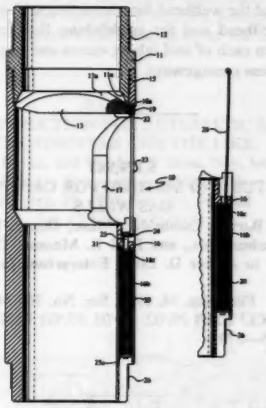
(b) a valve member having a hinge, said hinge pivotally connected to said housing;

(c) an annular seat member connected in said housing, said seat member having a flow passage therethrough, said valve member moveable between open position where two way flow may occur through said seat member and closed position where said valve member sealingly engages said seat member and closes said seat member flow passage to upward flow; and

(d) means for biasing said valve member toward closed position including:

a spring mounted in each housing wall hole,

a cable connected to and extending from each spring said cable pivotally and eccentrically connected to said valve member hinge so that when said valve member is moved toward open position, said spring is compressed causing



said cable to urge said valve member toward closed position.

5,159,982

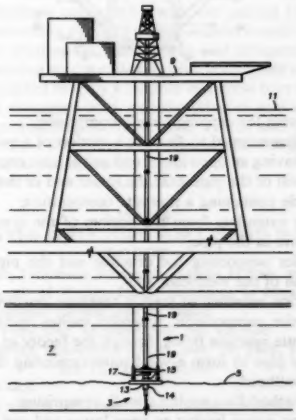
DOUBLE WALLED RISER

Joseph H. Hynes, Houston, Tex., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Jul. 26, 1991, Ser. No. 736,087

Int. Cl.[5] E21B *7/00*

U.S. Cl. 166—345 **20 Claims**



1. Apparatus for establishing fluid communication between annulus access passageways of a subsea wellhead and an offshore platform, the annulus access passageways communicating with selected wellhead annuli, comprising:

a string of double walled riser pipe extending from the offshore platform to the wellhead, said string of double walled riser pipe comprising an inner tubular wall means for containing wellhead pressures and an outer tubular wall means for imparting structural strength and rigidity to said string of pipe, there being an annular space between said inner wall means and said outer wall means;

fluid carrying tubing means disposed in said annular space

for each of the annulus access passageways of the wellhead, said tubing means extending from the wellhead to the platform; and

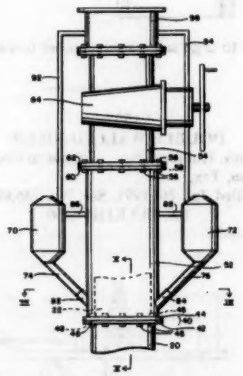
wellhead connector means disposed between said string of pipe and the wellhead for connecting said string of pipe to the wellhead and for establishing fluid communication between each of said tubing means and one of such annulus access passageways.

5,159,983

APPARATUS AND METHOD FOR CAPPING OIL OR GAS WELLS

Andrew R. Barron, Cambridge, Mass.; Dennis F. Cronin, Jr., Fredericksburg, Va., and Paul R. Manson, Croydon, N.H., assignors to Arthur D. Little Enterprises, Inc., Cambridge, Mass.

Filed Sep. 16, 1991, Ser. No. 760,340
Int. Cl.[5] E21B *29/02, 33/03, 35/00;* **F16L** *13/02*
U.S. Cl. 166—379 **48 Claims**



1. A system for capping a well, comprising:

a pipe dimensioned to fit over a section of a wellhead, the pipe having an open lower end and at least one aperture in the wall of the pipe near the lower end of the pipe;

a crucible containing a thermite composition;

a feeder extending from the bottom of the crucible to the aperture in the pipe;

means for supporting the crucible and the pipe over the section of the wellhead; and

an ignition member to start a thermite reaction from the thermite composition, whereby molten metal from the thermite reaction flows through the feeder to the interior of the pipe to form a weld interconnecting the pipe and the wellhead.

33. A method for capping a well, comprising:

providing a pipe having an open lower end and at least one aperture in the wall of the pipe near the open lower end of the pipe, the pipe so dimensioned that the open lower end of the pipe corresponds to a section of a wellhead;

placing the pipe over the section of the wellhead;

providing a thermite composition in a crucible;

igniting the thermite composition to start a thermite reaction;

introducing molten metal produced in the thermite reaction into the interior of the pipe through the aperture in the pipe; and

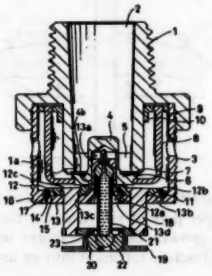
allowing the molten metal to solidify to form a weld fastening the pipe to the wellhead.

5,159,984

SPRINKLER HEAD

Takamasa Hattori, 218-315 Ogaito Oaza Kumatori-cho, Sennan-gun, Osaka-fu, Japan

Filed May 3, 1991, Ser. No. 695,561
Claims priority, application Japan, Jun. 22, 1990, 2-66651[U]
Int. Cl.[5] A62C *37/11*
U.S. Cl. 169—38 **5 Claims**



5. A sprinkler head whose exit is blocked by pressuring a heat sensitive part **21**, which part is broken by a heat expansion of a liquid **23**, sealed in the inside of the sprinkler head by means of an insertion of a screw **22**; comprising:

a couple of vertical clamps (**12** and **13**) set below a plug **4**, an elastic retainer **11** mounted between flanges (**12***b* and **13***b*) of the clamps (**12** and **13**) to block the exit **5** with the plug **4**;

a hollow projection **13***a* mounted on a lower clamp **13** of the clamps (**12** and **13**) so a part of said heat sensitive part **21** can be inserted, said projection **13***a* being slidably fitted into a hole **4***b* of said plug **4** through a hold **12***a* formed in an upper clamp **12** of the clamps (**12** and **13**), a hold plate **19**, which has a female screw **20** formed on an internal face thereof, mounted on a top of a connector railing **18**, a screw **22** is screwed into the female screw **20** of the hold plate **19**, an other part of the heat sensitive part **21** being formed so it can be pressured; and

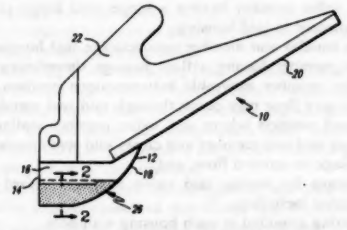
the retainer **11** is pressured by the clamps (**12** and **13**) against a side of a sprinkler head body **1** when the screw **22** is screwed, said retainer **11** being linked and held between an inboard concave **16** and the flanges (**12***b* and **13***b*), said retainer **11** is set on said concave **16** of a frame **3** of said sprinkler head body **1**.

5,159,985

AGRICULTURAL INSERT

Don C. Rowlett, Bedford, Pa., assignor to Kennametal Inc., Latrobe, Pa.

Filed Feb. 6, 1991, Ser. No. 651,662
Int. Cl.[5] A01C *5/06;* **A01B** *23/02*
U.S. Cl. 172—723 **18 Claims**



1. A hard wear resistant cemented carbide insert for use in an agricultural tool for forming a furrow, said insert comprising:

a leading end;

a trailing end of a generally triangular form;

a first side surface and a second side surface extending longitudinally from said trailing end to said leading end, sad first side surface and said second side surface intersecting to define a lowermost edge including a substantially linear portion adjoining a sloped curvilinear front portion; and

a top surface between said first side surface and said second side surface extending linearly from said trailing end to said leading end and having a contour from said trailing end to said leading end which converges to form a V-shape.

5,159,986

POWER TOOL

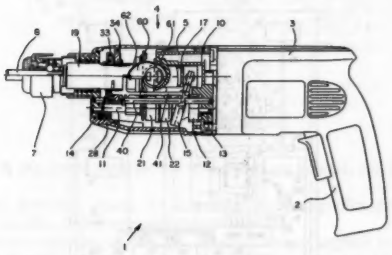
Jürgen Höser, Neu-Ansbach, Fed. Rep. of Germany, assignor to Black & Decker, Inc., Newark, Del.

Division of Ser. No. 689,444, Apr. 22, 1991, Pat. No. 5,125,461. This application May 18, 1992, Ser. No. 885,137

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1990, 4013512

Int. Cl.[5] E21C *3/32*; B25D *11/10*

U.S. Cl. 173—48 **17 Claims**



1. A power tool adapted to hold a tool bit which can be operated with a rotating action and a hammer action, comprising:

drive means for causing the tool bit to rotate including a gear assembly which can be switched between a drive disposition and a non-drive disposition;

hammer means for imparting a hammer action to the tool bit and activated by axial displacement of the tool bit on engagement of said tool bit with a work piece;

an adjustment handle connected to stop means and rotatable about an adjustment axis between a first position in which the stop means allows axial displacement of the tool bit to activate the hammer means and a second position in which the stop means blocks axial displacement of the tool bit;

a cam member coupled to the adjustment handle and having an arcuate cam surface, said surface comprising a first, circular portion concentric with the adjustment axis and a second portion leading from one end of the first portion and continuously changing in distance from said axis;

an adjustment element engaging the cam surface movement of which is arranged to switch said gear assembly between said drive and non-drive dispositions;

the arrangement being such that when the adjustment handle is in its first position the adjustment element is in engagement with one end of said first portion of the cam surface, when the adjustment handle is in its second position the adjustment element is in engagement with the other end of the first portion of the cam surface, with no movement of the adjustment element taking place as the adjustment handle is moved between its first and its second positions;

the adjustment handle being movable into a third position beyond one of its first and second positions so that the adjustment element is in engagement with the second portion of the cam surface and the adjustment element is displaced to cause the gear assembly to change between said drive and non-drive dispositions; and wherein

the second portion of the cam surface continues from that end of the first portion of the cam surface associated with the first position of the adjustment handle, and movement of the adjustment handle into its third position from the first position renders the rotating drive for the tool bit ineffective.

5,159,987

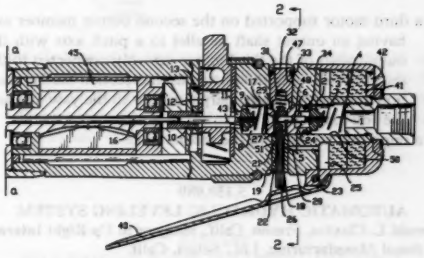
VALVE CONSTRUCTION FOR AUTOMATIC SHUT-OFF SCREWDRIVERS AND THE LIKE

Phil D. Thorp, Bryan, and Stephen F. Sims, Ney, both of Ohio, assignors to The Aro Corporation, Bryan, Ohio

Filed Sep. 27, 1991, Ser. No. 766,782

Int. Cl.[5] B25B *23/145*

U.S. Cl. 173—176 **14 Claims**



1. A valve construction for an automatic and a manual shut-off tool and the like comprising:

an elongated bore in the tool having disposed therein a first and second valve element accomplishing respectively manual and automatic shut-off of said tool, one of said valve elements cooperating with and guided by a valve body removably disposed from a one end in said elongated bore for shutting off fluid flow in said elongated bore in one operating mode, and said valve body being secured in said elongated bore by a fastener in a cross bore intersecting said elongated bore, and the other of said valve elements cooperating with the other end of said elongated bore to effect shut-off of fluid flow in said elongated bore in an alternative operating mode.

5,159,988

ARTICULATED STRUCTURE FOR LEGGED WALKING ROBOT

Hiroshi Gomi; Tomoharu Kumagai; Masato Hirose, and Masao Nishikawa, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 14, 1990, Ser. No. 627,638

Claims priority, application Japan, Dec. 14, 1989, 1-324218

Int. Cl.[5] B62D *57/02*

U.S. Cl. 180—8.6 **6 Claims**

1. An articulated structure in a walking robot having legs comprising:

a body;

a pelvis plate supporting the body;

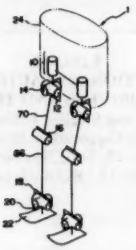
a first motor attached to the pelvis plate and having an output shaft parallel to a yaw axis;

a yaw joint including a first yoke rotatably attached to the pelvis plate through a first output member and pivotable abut the yaw axis;

means for drivably connecting the output shaft of the first motor to the first yoke;

a second motor supported by the first yoke and having an output shaft parallel to a roll axis perpendicular to the yaw axis and intersecting the yaw axis at an intersection point;

a second output member rotatably attached to the first yoke;
a roll joint including a second yoke rotatably attached to the second output member and pivotably about the roll axis;
means for drivably connecting the output shaft of the second motor to the second yoke;



a third motor supported on the second output member and having an output shaft parallel to a pitch axis with the output shaft of the third motor drivably connected to the second yoke, with the pitch axis intersection the intersection point and oriented perpendicular to the yaw axis and the roll axis; and
a thigh link attached to the second yoke.

5,159,989

AUTOMATIC HYDRAULIC LEVELING SYSTEM

Gerald L. Claxton, Fresno, Calif., assignor to Up-Right International Manufacturing, Ltd., Selma, Calif.

Filed Oct. 9, 1991, Ser. No. 773,507
Int. Cl.[5] B60G *21/00*
U.S. Cl. 180—41 **13 Claims**

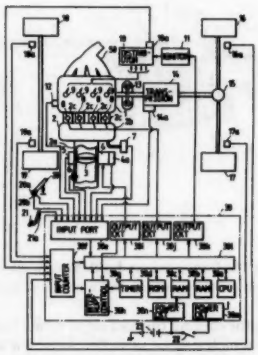
1. A leveling system for a wheeled vehicle having generally horizontal chassis with right front, left front, right rear and left rear corners, a wheel at each of said corners, an outrigger pad at each of said corners, an extensible hydraulic cylinder at each of said corners for individually moving said pads upwardly or downwardly relative to its corner of said chassis, said hydraulic cylinders each having head and rod ends, said leveling system comprising:
means for concurrently generating high-pressure and low-pressure hydraulic fluids,
first fluid control means for connecting said low-pressure fluid for one-way flow to the head ends of all four of said cylinders,
second fluid control means for connecting said high pressure fluid to the head end of said right front cylinder when the right front chassis corner is lower than the left rear chassis corner and for connecting said high-pressure fluid to the head end of said left rear cylinder when said left rear chassis corner is lower than the right front chassis corner,
third fluid control means for connecting said high-pressure fluid to the head end of said left front cylinder when said left front chassis corner is lower than the right rear chassis corner and for connecting said high-pressure fluid to the head end of said right rear cylinder when said right rear chassis corner is lower than the left front chassis corner.

5,159,990

WHEEL SLIPPAGE CONTROL APPARATUS IN MOTOR VEHICLE

Tomoaki Abe, 2-2-6, Momoyama-cho, Oobu-shi, Aichi-ken; Katsuya Maeda, 20-3, Sousaku, Ogakie-cho, Kariya-shi, Aichi-ken; Mitsuo Hara, 15-7, Aza Anderamae, Akechi-cho, Bisai-shi, Aichi-ken; Shigeru Kamio, 1-22-23, Kyoumei, chikusa-ku, Nagoya, and Mitsunori Takao, 21-7, Takasu-cho, 2-chome, Kariya-shi, Aichi-ken, all of Japan

Continuation of Ser. No. 376,661, Jul. 7, 1989, abandoned. This application Mar. 27, 1991, Ser. No. 676,477
Claims priority, application Japan, Jul. 7, 1988, 63-169965
Int. Cl.[5] B60K *31/00, 13/00*
U.S. Cl. 180—197 **24 Claims**



1. A slip control apparatus for use in a motor vehicle, comprising:
an engine mounted on said motor vehicle for generating a motive power to drive said motor vehicle;
first detection means for detecting a speed of a driven wheel of said motor vehicle which is driven by the motive power generated by said engine;
second detection means for detecting a speed of said motor vehicle;
decision means for determining an occurrence of slipping of said driven wheel on the basis of the detection results of said first and second detection means;
third detecting means for detecting the degree of materials combustible as a whole int said engine;
means for quantifying, from the detected speed of the driven wheel, the degree of an acceleration of driven wheel at the time of the determination of occurrence of slipping;
setting means for setting a target driven-wheel speed on the basis of the vehicle speed of said motor vehicle detected by said second detection means when said decision means determines the occurrence of slipping of said driven wheel;
target-torque calculation means for calculating a target torque of said engine based on a deviation between the driven-wheel speed detected by said first detection means and the target driven-wheel speed set by said setting means and, on the result of detection by said third detecting means;

torque adjusting means for adjusting a torque of said engine; and

control means for controlling said torque adjusting means on the basis of the target-torque of said engine calculated by said target-torque calculation means and the degree of acceleration quantified by said quantifying means.

5,159,991

SLIP CONTROL SYSTEM FOR AUTOMOTIVE VEHICLE

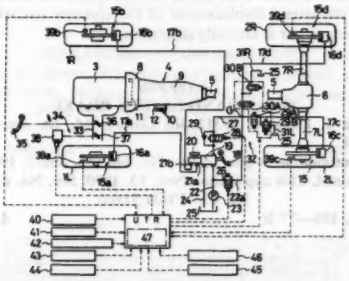
Toshiaki Tsuyama; Kazutoshi Nobumoto; Fumio Kageyama, and Haruki Okazaki, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Mar. 5, 1991, Ser. No. 665,191

Claims priority, application Japan, Mar. 7, 1990, 2-57591

Int. Cl.[5] B60K *28/16*

U.S. Cl. 180—197 **32 Claims**



1. A slip control system for an automotive vehicle, comprising:

slip detecting means for detecting wheel slip of a driven wheel relative to a surface of the road;

torque adjusting means for adjusting torque applied to the wheel by adjusting at least one of engine output and braking force applied to the wheel;

slip control means for controlling said torque adjusting means so as to suppress the wheel slip detected by said slip detecting means;

outside air temperature sensing means for sensing outside air temperature; and

control degree altering means for altering a control degree for slip control to a greater extent when the outside air temperature sensed by said outside air temperature sensing means is lower than a predetermined value than when the outside air temperature is higher.

5,159,992

INFINITELY VARIABLE HYDROSTATIC TRANSMISSION DRIVE

Udo Reinecke, Dortmund, and Gustav Leidinger, Friedberg, both of Fed. Rep. of Germany, assignors to O&K Orenstein & Koppel Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Continuation of Ser. No. 475,045, Feb. 2, 1990, abandoned. This application Sep. 6, 1991, Ser. No. 759,112

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1989, 3907633

Int. Cl.[5] B60K *17/356*

U.S. Cl. 180—307 **10 Claims**

6. A hydrostatic drive transmission for self-propelled vehicles comprising

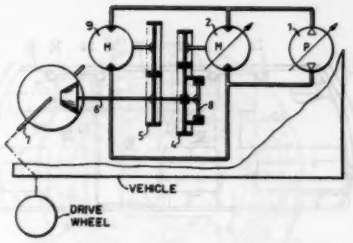
a plurality of hydraulic transmission motors;

a common displaceable transmission-drive pump which feeds said motors;

a back gearing having a common output and including a shift coupling; and

wherein said motors include a first variable displacement motor which is variable from full absorption volume, and at least one second variable displacement motor which is variable from full absorption volume to minimum absorption volume, said first and said second motors being connected in a parallel hydraulic circuit, at least one of said motors operating via said back gearing to drive said common output;

said shift coupling is connected between said first variable displacement motor and said output; and



said first variable displacement motor is operative to undergo a transition from the full absorption volume to the minimum absorption volume upon a disconnection of said first variable displacement motor from said common output by said shift coupling.

5,159,993

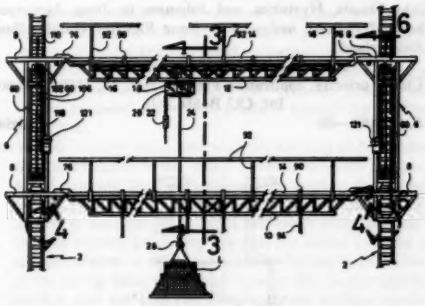
SELF-RAISING WORK PLATFORM ASSEMBLY

André St-Germain, Sainte-Marthe-sur-le-Lac, Canada, assignor to Gestion des brevets Fraco limitée, Sainte-Thérèse, Canada

Filed Oct. 15, 1991, Ser. No. 775,908

Int. Cl.[5] E04G *1/20*

U.S. Cl. 182—82 **20 Claims**



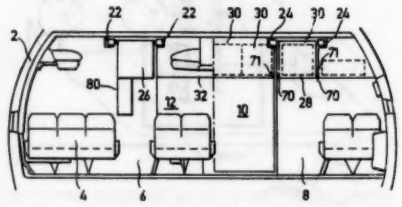
1. A self-raising work platform assembly for buildings, comprising a pair of towers adapted to be horizontally spacedly positioned adjacent a building structure, vertically spaced anchor means fixed to each tower and adapted to be fixed to said adjacent building structure to maintain said towers upright, an elongated sleeve surrounding and movable up and down each tower and having a longitudinally-extending slit opening at both ends of said sleeve to clear said anchor means, guiding means guiding said sleeves for up-and-down movement along said towers, lifting means interconnecting each tower and related sleeve to raise said sleeves and allowing lowering by gravity of said sleeves along said towers, a first joist structure horizontally extending between and releasably hooked to said sleeves, and flooring supported by said joist structure.

5,159,994

FOOD STORAGE AND DELIVERY SYSTEM FOR PASSENGER VEHICLES, PARTICULARLY AIRCRAFT

David Luria, Tel Aviv, Israel, assignor to Fuselage Engineering Services Ltd., Tel Aviv, Israel

Filed Mar. 20, 1991, Ser. No. 672,303
Claims priority, application Israel, Mar. 26, 1990, 93877
Int. Cl.[5] B64D *11/04*
U.S. Cl. 186—40 **21 Claims**



1. A food storage and delivery system for passenger vehicles having a plurality of seats separated by at least one aisle, comprising:

a rail mounted to the top of the vehicle and extending parallel to said aisle along the length thereof;

a carriage suspended from said rail above said seats and movable along the length of said aisle;

a food container for containing food articles, said food container being carried on said carriage and movable therewith along the length of said aisle;

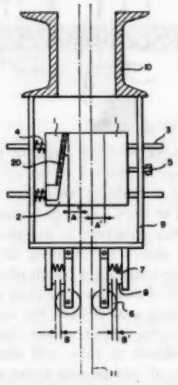
and a horizontal platform laterally of said rail, above said seats, and at the same level as, so as to be horizontally aligned with, said carriage for holding a plurality of said food containers, each horizontally aligned with said carriage for transferring a food container thereto.

5,159,995

SAFETY GEAR FOR AN ELEVATOR

Mikko Sissala, Hyvinkaa, and Johannes de Jong, Jarvenpaa, both of Finland, assignors to Kone Elevator GmbH, Baar, Switzerland

Filed Dec. 14, 1990, Ser. No. 627,599
Claims priority, application Finland, Dec. 18, 1989, 896060
Int. Cl.[5] B66B *5/16*
U.S. Cl. 187—88 **3 Claims**



1. A safety gear device for mounting on an elevator car, which car moves along guide rails, said safety gear device comprising:

a frame provided with at least one transversal bar, placed transversely relative to the frame;

a safety gear housing, laterally displaceable on said at least one transversal bar and containing at least one wedge movable relative to said safety gear housing; and

guiding means for controlling the lateral motion of said safety gear housing so that at least a certain preset clearance between the wedge and the guide rail is maintained;

said guiding means being placed on said safety gear housing symmetrically on either side of the guide rail in such manner that, in a normal operational situation, the clearance between said guiding means and the guide rail is smaller than the clearance between the wedge and the guide rail, thereby maintaining an essentially constant minimum distance between the wedge and the guide rail;

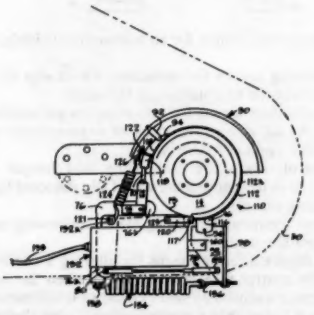
said guiding means contacting the guide rail and causing said safety gear housing to move transversely along said at least one transversal bar in the opposite direction relative to the lateral displacement of the elevator car when the elevator car is laterally displaced.

5,159,996

WRAP BAND SAFETY BRAKE

Reynold J. LeBlanc, 45312 Joe Guidry Rd., St. Amant, La. 70774

Continuation-in-part of Ser. No. 548,555, Jul. 7, 1990, abandoned. This application Nov. 13, 1990, Ser. No. 611,975
Int. Cl.[5] F16D *51/00*
U.S. Cl. 188—77 R **4 Claims**



1. A supplementary braking system for a drum brake connected to a crane cable spool having a cylindrical brake drum with a cylindrical interior braking surface and a cylindrical exterior surface, internal brake shoes, and a mechanically operated lever arm for forcing the brake shoes into contact with the interior braking surface of the brake drum, the mechanically operated lever arm being operated by a hydraulic cylinder and piston assembly connected to the crane cable spool and located adjacent to the brake drum, the piston being forced to retract into the cylinder by a first spring connected to the lever arm and to the cable spool, comprising:

a. friction band means wrapped around the exterior of the cylindrical brake drum for contacting the cylindrical exterior surface of the brake drum, said friction band means having a first end and a second end, said friction band means being shorter in length than the circumference of the exterior surface of said brake drum,

b. first fastening means connected to said first end of said friction band means for fastening said first end of said friction band means adjacent to said brake drum,

c. a rigid pivot member constructed from a rigid, flat plate having a first leg and a second leg connected at an approximate right angle,

said pivot member being pivotally connected at the intersec-

tion of said first leg and said second leg of said pivot member to a fixed pivot pin,

said first leg of said pivot member being pivotally connected to said second end of said friction band means for biasing said second end of said friction band means

i. away from the cylindrical exterior surface of said brake drum as the piston is extended, and

ii. toward the exterior cylindrical surface of said brake drum as the piston is retracted,

said second leg of said pivot member means being pivotally connected to the lever arm operated by the hydraulic cylinder and piston by rigid rod means, and

d. a second spring having a first end and a second end, said first end of said second spring being connected to said second end of said friction band means of biasing said friction band means against the cylindrical exterior surface of said brake drum, and said second end of said second spring being connected to said pin means.

5,159,997

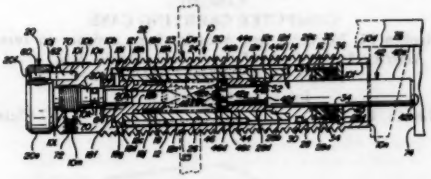
MINIATURE SHOCK ABSORBER

Robert J. Heideman, Westland, and Richard T. Mitera, Canton, both of Mich., assignors to Enertrols, Inc., Westland, Mich.

Filed Oct. 31, 1990, Ser. No. 606,443

Int. Cl.[5] F16F *9/50*

U.S. Cl. 188—282 **18 Claims**



1. A shock absorber comprising:

an outer tubular housing having a front end and a rear end and defining a central axis;

an inner tubular housing having a front end and a rear end, positioned within said outer tubular housing, and defining a pressure chamber within said inner housing and an annular accumulator chamber between said inner and outer housings;

a piston assembly including a piston mounted for reciprocal sliding movement in said inner tubular housing and a piston rod connected to said piston and extending out of said front end of said tubular housings for impact by an object to be decelerated;

port means establishing fluid communication between said pressure chamber and said accumulator chamber proximate the forward end of said pressure chamber;

port means establishing fluid communication between said pressure chamber and said accumulator chamber proximate the forward end of said pressure chamber;

means operative at all times, and irrespective of the fluid pressures in said pressure chamber and in said accumulator chamber, to preclude movement of fluid through said port means from said pressure chamber to said accumulator chamber; and

valving means establishing fluid communication between said pressure chamber and said accumulator chamber proximate the rearward end of said pressure chamber and including means defining an axially extending passage proximate the rearward end of said pressure chamber and a valve member positioned in said passage to define an annular orifice with said passage means, adjustably movable along an axis parallel to said central axis, and operative in response to such movement to vary the size of said orifice and thereby vary the resistance to movement of fluid through said valving means.

5,159,998

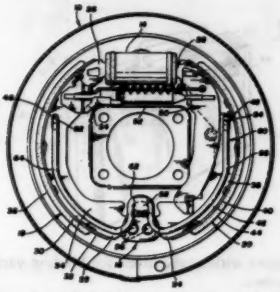
UNISPRING DRUM BRAKE ASSEMBLY

Douglas M. Coop, West Milton; Robert W. Hyde; Frank W. Brooks, Sr., both of Dayton; Gary G. Holliday, Vandalia, and Michael W. Fanelli, Centerville, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 2, 1991, Ser. No. 739,148

Int. Cl.[5] F16D *51/26*

U.S. Cl. 188—340 **6 Claims**



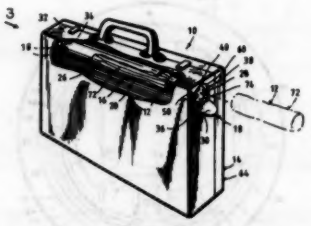
1. A drum brake comprising:

a backing plate having mounted thereon a wheel cylinder, a pair of brake shoe assemblies having a first set of engaging ends engaging the wheel cylinder for actuation, each of the brake shoe assemblies including a shoe web having a slot formed therein, and a single generally U-shaped spring combining functions of shoe hold-down and shoe retracting spring and shoe guide means, the single spring having a center loop section and first and second spring arms extending from the center loop section, the center loop section having loop arms connecting with the first and second spring arms in bent relation and the center loop section having a loop back section connecting the loop arms, the spring arms extending in bent relationship from the loop arms in general arcuate opposed directions and having hooked ends received in the shoe-web slots in spring loaded relationship, the spring arms providing shoe-web guides keeping the shoe webs in guided relation, the spring being spring loaded so as to continually urge the brake assemblies towards the retracted position and also in resilient hold-down position against the backing plate, and;

an anchor fixably connected with the backing plate circumferentially opposite the wheel cylinder wherein a second set of adjacent shoe ends engage the anchor, the anchor having a lower body portion and the anchor having connected to and extending from the lower body portion a tab-like portion extending towards the wheel cylinder in spaced relation to the backing plate, the loop back section of the spring being positioned between the anchor tab-like portion and the backing plate with the anchor tab-like portion being engaged by the loop back section of the spring and providing spring reaction to spring force exerted thereon in a direction away from the backing plate for a shoe hold-down, the spring arms bring a spring force engaging relationship with the lower body portion of the anchor on a side of the lower body portion thereof opposite the backing plate with the spring force exerted on the anchor by the loop arms being in a direction towards the backing plate, and wherein the anchor lower body portion having on a side away from the backing plate two spaced alpha locator pads for isolating the spring from contact with a remainder of the anchor lower body portion and the anchor on the side of the tab-like portion towards the backing plate having a beta locator isolation surface for contact with the spring loop back section wherein when installed the spring makes three-point contact with the

beta locator isolation surface and the lower body portion alpha locator pads.

5,159,999
CONTAINER WITH A TUBE INSERT
Bernard Voigt, 15 High St., Hicksville, N.Y. 11801
Filed Nov. 12, 1991, Ser. No. 791,004
Int. Cl.[5] A45C *13/40*
U.S. Cl. 190—111 **11 Claims**



1. A container with a tube insert for holding various articles which comprises:

a) a receptacle in which material is held and carried therein;

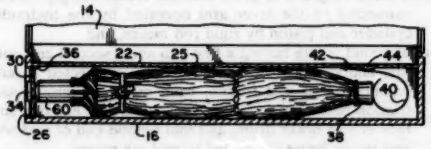
b) a tube insert incorporated within said receptacle, for holding one of the articles therein, said tube insert including an elongated hollow cylinder having a closed end, an opened end and a compartment for holding the one article therein;

c) means incorporated to said receptacle and in conjunction with said tube insert, for allowing removal of the one article therefrom without a person having to open said receptacle, said removal means including an aperture in said receptacle, an easy access cover connected to said receptacle at said aperture and the opened end of said elongated hollow cylinder, a spring inserted within the compartment of said elongated hollow cylinder and against the closed end thereof, and a disc member inserted within the compartment of said elongated hollow cylinder and attached to a free end of said spring, so as to help eject the one article therefrom when said easy access cover is placed in an opened position, said easy access cover including a hinge connected between one side of said easy access cover and said receptacle so that said easy access cover can be pivoted to the opened position and a closed position at the opened end of said elongated hollow cylinder and means for retaining said easy access cover when in the closed position over the opened end of said elongated hollow cylinder so as to keep the one article within the compartment in said elongated hollow cylinder;

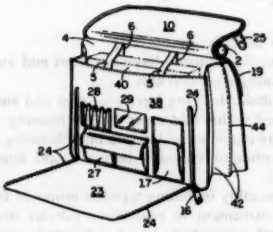
d) an L-shaped brace member having a pair of legs with a hole through one of said legs, said brace member is mounted within said receptacle at said aperture, so that said leg with said hole is positioned over the opened end of said elongated hollow cylinder behind said easy access cover to give extra support thereto, while said L-shaped brace member also supports a corner of said receptacle as well as said elongated hollow cylinder.

5,160,000
ATTACHE AND UMBRELLA CARRYING CASE
Mary Agha, and Zahid Agha, both of 5 Libby Ave., Hicksville, N.Y. 11801
Filed Feb. 7, 1992, Ser. No. 836,215
Int. Cl.[5] A45C *13/40*
U.S. Cl. 190—102 **2 Claims**

1. In an attache case of the type having a rectangular body with external wall means bounding an internal main storage compartment for paper contents and having an attached carrying handle, the combination of internal wall means within said body oriented lengthwise thereof to delineate an umbrella storage compartment within said main storage compartment, means providing an external access opening into said umbrella storage compartment, a battery operated signally means electrically connected to normally provide a light display strategically located adjacent said carrying handle to signify to the user the absence of an umbrella within said umbrella storage compartment, and in controlling relation to said signally means a switch means disposed within said umbrella storage compartment at a selected spaced distance remote from said access opening thereinto to cause the establishment of contact between a distal end of an umbrella projected within said umbrella storage compartment and said switch means, whereby said established contact of said umbrella distal end against said switch means results in said light display signifying to the user the presence of an umbrella within said umbrella storage compartment.



5,160,001
COMPUTER CARRYING CASE
Stephen M. Marceau, San Antonio, Tex., assignor to Incom America, Inc. A Corp. of Texas, San Antonio, Tex.
Filed Mar. 9, 1992, Ser. No. 848,702
Int. Cl.[5] A45C *3/00, 13/10*
U.S. Cl. 190—102 **7 Claims**



1. In a soft carrying case for the transportation of a portable notebook computer unit:

a rod extending essentially the full width of said case and integrally contained within the upper surface of said case to which a centrally located full length dividing wall may be attached;

a first cover flap depending from the top of said case to cover and essentially close at least one pocket formed within said case on a first side of said dividing wall;

a second cover flap depending from the opposite side of the top of said case to cover and essentially close at least one pocket designated for holding a portable notebook computer unit on a second side of said dividing wall;

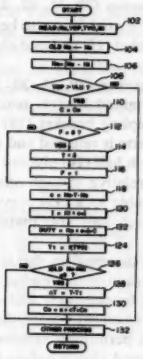
at least one pair of laterally spaced straps vertically extending around the rod and attached to the central dividing wall in said designated pocket from near the top of said pocket to a point partway down said dividing wall and spaced from the case bottom so as to securely contain a portable notebook computer unit against the upper portion of said dividing wall when said straps are fixed around said computer protecting the portable notebook computer unit from damage and making the case and computer easier to carry.

5,160,002

SYSTEM AND METHOD FOR ADAPTIVE LOCK-UP CONTROL

Yutaka Suzuki, Kanagawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 3, 1991, Ser. No. 681,673
Claims priority, application Japan, Apr. 6, 1990, 2-92667
Int. Cl.[5] F16D *33/16*
U.S. Cl. 192—3.31 **7 Claims**



1. A system for an adaptive control of a lock-up clutch in a hydrokinetic torque transmitting unit including a pump impeller coupled with an engine, and a turbine runner, the lock-up clutch being engageable to connect the turbine runner to the pump impeller, the system comprising:

means for generating an operating signal, said operating signal including an initial value and a term related to a difference between an actual slip in the hydrokinetic torque transmitting unit and a target slip;

means, including an electric actuator, for controlling engagement of the lock-up clutch in response to said operating signal,

wherein, during occurrence of engagement of the lock-up clutch, an actual lag before initial engagement of the lock-up clutch is determined, and a deviation of said actual lag from a target time interval is determined, said initial value being modified in response to said deviation in such a direction so that a subsequent occurrence of engagement of the lock-up clutch using a modified initial value results in a reduction in said deviation.

5,160,003

LOCK-UP CONTROL FOR SMOOTH START-UP

Yutaka Suzuki, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

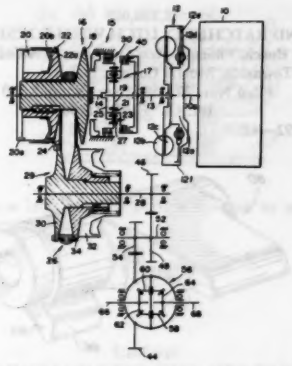
Filed Apr. 8, 1991, Ser. No. 681,675
Claims priority, application Japan, Apr. 6, 1990, 2-92668
Int. Cl.[5] F16D *47/02*
U.S. Cl. 192—3.31 **7 Claims**

1. A system for a control of a lock-up clutch in a hydrokinetic torque transmitting unit including a pump impeller coupled with an engine, and a turbine runner, the lock-up clutch being engageable to connect the turbine runner to the pump impeller, the system comprising:

means, including an electric actuator, for controlling engagement of the lock-up clutch in response to an operating signal supplied thereto;

means for generating said operating signal supplied to said engagement controlling means,

wherein, during engagement of the lock-up clutch, a target engine revolution speed is determined, and an actual engine revolution speed is detected, and said operating signal is modified in such a direction as to decrease a difference between said determined target engine revolution speed and said detected actual engine revolution speed



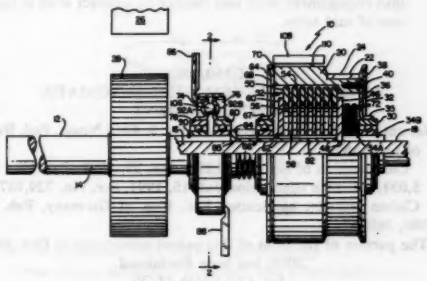
toward zero until the lock-up clutch is completely engaged.

5,160,004

CLUTCH/BRAKE MECHANISM

Michael P. Scott, Midland, and Andrew C. Cutler, Mt. Pleasant, both of Mich., assignors to DANA Corporation, Toledo, Ohio

Filed Aug. 26, 1991, Ser. No. 750,184
Int. Cl.[5] F16D *67/02*
U.S. Cl. 192—17 R **7 Claims**



1. A clutch/brake mechanism for use in a power driven system, comprising:

a drive shaft operatively connected to the power driven system;

an output drive rotatably connected to said shaft;

means connected to said shaft for drivingly engaging said shaft to said output drive such that said shaft and said output drive are cooperatively rotatable, wherein said engaging means are normally engaged with said output drive;

a brake for braking said output drive against rotation;

means connected to said shaft for disengaging said drive engaging means; and

means connected to said shaft for actuating said disengaging means and said brake, wherein disengaging of said engaging means occurs through relatively slight actuation of said actuator means and braking of said output drive occurs through relatively considerable actuation of said actuator means, said mechanism further characterized such that substantially no simultaneous engagement of said engaging means and said brake occurs throughout

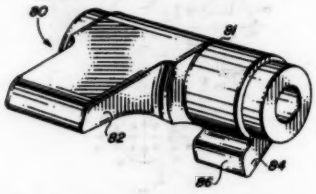
actuation of said actuator means, and wherein braking force increases with increased actuation of said actuator means.

5,160,005

PAWL AND RATCHET CLUTCH WITH TORSION SHAFT

Darrel W. Burch, Phoenix, Ariz., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Nov. 27, 1990, Ser. No. 618,780
Int. Cl.[5] F16D *11/06*
U.S. Cl. 192—42 **10 Claims**



1. A pawl and ratchet clutch operably disposed between a driving member and a driven member comprising:

an input member, having a ratchet, secured to said driving member for rotation therewith;

a hollow output member secured to said driven member for rotation therewith;

a torsion shaft mounted within said output member, said torsion shaft having a first end secured to a plate member having a plurality of radially extending arms; and

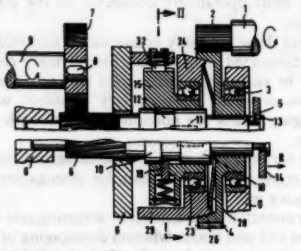
a plurality of pawls mounted within said output member so as to be responsive to a centrifugal force resulting from rotation of the output member to tend toward disengagement from said ratchet, and also mounted within said output member so that each pawl of said plurality is urged into engagement with said ratchet by contact with at least one of said arms.

5,160,006

OVERLOAD CLUTCH WITH AUTOMATIC DISENGAGEMENT

Helmut Dischler, Droste-Hülshoff-Str. 9, 4040 Neuss, Fed. Rep. of Germany

Continuation of Ser. No. 8,298, Jan. 29, 1987, Pat. No. 5,031,742. This application Jul. 15, 1991, Ser. No. 729,937
Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603672
The portion of the term of this patent subsequent to Oct. 16, 2005, has been disclaimed.
Int. Cl.[5] F16D *43/20*
U.S. Cl. 192—56 R **7 Claims**



1. An overload clutch which automatically disengages when a limit load is reached, comprising

a) first (24) and second clutch halves (4), said first and second clutch halves (24,4) being fictionally engageable with each other,

b) one of said clutch halves (24) being mounted in said clutch so as to be displaceable against a spring force (28) relative to said other clutch half (4),

c) said one of said clutch halves (24) being pivoted on a coupling bracket (15),

d) said coupling bracket (15) being non-rotatably mounted on a coupling shaft (5),

e) said coupling bracket (15) and said clutch half (24) pivoted thereon being connected to each other via a catch mechanism (29, 31, 32, 22) for the transmission of torque between said coupling bracket (15) and said clutch half (24) pivoted thereon,

f) said catch mechanism (29, 31, 32, 22) being mounted so that it is relieved of axial forces to be transmitted between said coupling bracket (15) and said clutch half (24) pivoted thereon,

g) said catch mechanism (29, 31, 32, 22) being set so that when a predetermined load is reached, the connection between said coupling bracket (15) and said clutch half (24) pivoted thereon is released and said coupling bracket (15) and said clutch half (24) pivoted thereon can rotate to a limited extend relative to each other, and

h) at least one movable lock (19) preventing axial displacement of said clutch half (24) pivoted on said coupling bracket (15),

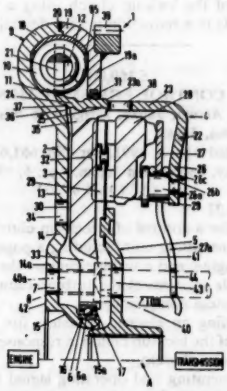
said lock (19) being mounted so that it moves out of a locking position as a result of the relative rotational movement of said coupling bracket (15) and said clutch half (24) pivoted thereon when said catch mechanism (29, 31, 32, 22) releases, thus permitting relative axial movement of said first and second clutch halves (24, 4) in a direction which disengages them.

5,160,007

APPARATUS FOR TRANSMITTING TORQUE IN THE POWER TRAINS OF MOTOR VEHICLES

Wolfgang Reik, Bühl, and Johann Jäckel, Baden-Baden, both of Fed. Rep. of Germany, assignors to LUK Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany

Filed May 31, 1991, Ser. No. 708,934
Claims priority, application Fed. Rep. of Germany, May 31, 1990, 4017519; Jun. 29, 1990, 4020759; Aug. 31, 1990, 4027542; Aug. 31, 1990, 4027593; Aug. 31, 1990, 4027614; Aug. 31, 1990, 4027629; Dec. 24, 1990, 4041709; Dec. 24, 1990, 4041722
Int. Cl.[5] F16D *03/66, 03/14*
U.S. Cl. 192—70.17 **83 Claims**



1. A torque transmitting apparatus for use in motor vehicles, comprising a first rotary flywheel connectable with an engine of a vehicle; a second rotary flywheel connectable with a transmission of the vehicle by a friction clutch; at least one

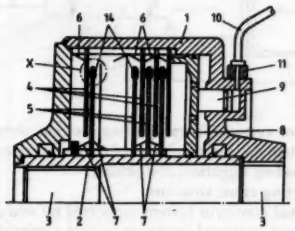
antifriction bearing between said flywheels; and at least one damper operative to oppose rotation of said flywheels relative to each other and disposed in an annular chamber defined at least in part by said first flywheel, said damper including energy storing elements acting in the circumferential direction of said flywheels and said clutch including a cover affixed to said second flywheel and having an outer portion provided with stressing portions extending into said chamber and engaging said energy storing elements.

5,160,008

ADJUSTABLE VISCOUS SHEAR COUPLING

Othmar Peier, Pöllau, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Jan. 17, 1992, Ser. No. 822,594
Claims priority, application Austria, Jan. 22, 1991, 122/91
Int. Cl.[5] F16D *35/00*
U.S. Cl. 192—85 C **7 Claims**



1. An adjustable viscous shear coupling suitable for use in a high performance four wheel drive vehicle, comprising

a housing containing a viscous fluid therein,

a shaft extending into said housing,

a set of outer disks non-rotatably connected to said housing,

a set of inner disks non-rotatably connected to said shaft, said inner and outer disks being interleaved and having a gap width therebetween,

an axially movable pressure piston bearing against said disks to adjust the gap width between said inner and said outer disks,

one of said sets of inner and outer disks including surfaces having friction linings thereon, said inner and outer disks being brought to bear against each other in a controlled manner so that torque can be transmitted in a hump-less manner by a combination of frictional engagement and viscous shear.

5,160,009

PASSENGER CONVEYOR AND MOVING HANDRAIL FOR PASSENGER CONVEYOR AND MANUFACTURING METHOD THEREFOR

Hiroumi Iyoda; Chuichi Saito, both of Katsuta; Mamoru Shiina, and Yoshitaka Fujii, both of Hitachi, Japan, assignors to Hitachi, Ltd. and Hitachi Cable, Ltd., both of Tokyo, Japan

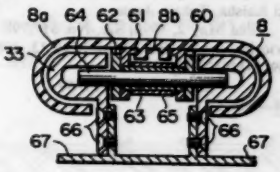
Filed May 4, 1990, Ser. No. 519,121
Claims priority, application Japan, May 8, 1989, 1-113745; Sep. 20, 1989, 1-242261
Int. Cl.[5] B66B *23/24*
U.S. Cl. 198—337 **15 Claims**

1. A passenger conveyor comprising:

an endless moving handrail mounted on a guide member provided around a balustrade, said moving handrail including a core member formed in an endless manner and a surface decorative member removably engaged with said core member and covering a surface of said core member over the whole length thereof; and

a handrail driving means for driving said core member of said moving handrail to move along a circulating path,

wherein said core member includes projecting portions guided in a guide groove of said guide member and engaging and holding portions for engaging with and holding said surface decorative member, said guide member includes at least a lateral portion covered by said surface decorative member.

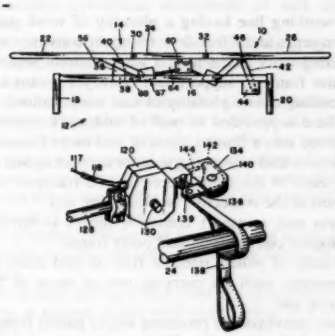


5,160,010

ADJUSTABLE BED WITH SIDE RAIL

Warren J. Peterson, Stevens Point, Wis., assignor to Joerns Healthcare Inc., Stevens Point, Wis.

Continuation-in-part of Ser. No. 540,282, Jun. 18, 1990, Pat. No. 5,105,486. This application Jun. 27, 1991, Ser. No. 722,091
Int. Cl.[5] A61G *7/00*
U.S. Cl. 5—613 **8 Claims**



1. An adjustable bed, said bed comprising:

a base frame defining a head end and a foot end;

a mattress frame including a head section and a lower section pivoted to said head section;

mounting means on the base frame for mounting the mattress frame to said base frame and permitting the head section to tilt with respect to said base frame and said lower section; and

positioner means interconnecting said head section and said lower section for positioning and locking the angular relationship of said sections, said positioner means including: a first link having an end fixed to said head section and a free end, a bracket fixed to said lower section, an elongated rod having a free end and another end pivoted to said bracket, and lock means pivoted to said free end of said first link for locking said rod free end with respect to said first link and, hence, said head section with respect to said lower section, said lock means including actuator means for permitting actuation of said lock means in two alternative modes, and wherein said actuator means includes a patient operated pull strap connected to said lock means and an attendant operated mechanism connected to said lock means.

5,160,011

WORKING LINE

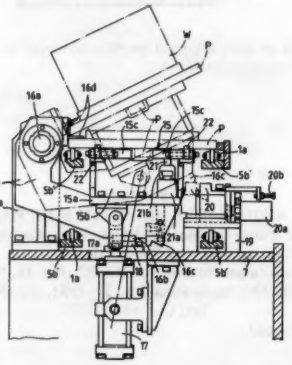
Takeo Yoshiji; Yutaka Sato; Akira Takeshima, and Teruo Yoshioka, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 2, 1990, Ser. No. 517,798

Claims priority, application Japan, May 13, 1989, 1-119974; Nov. 8, 1989, 1-129673[U]

Int. Cl.[5] B65G *15/64*

U.S. Cl. 198—345.3 3 Claims



1. A working line having a plurality of work stations arranged in series and a free-flow transport conveyor means for transporting work pieces to said work stations, wherein:

an outer frame to support said conveyor means is formed extending over a plurality of said work stations;

a jig base is provided in each of said work stations and is inserted into a framed space of said outer frame;

a jig is provided on each jig base for supporting and positioning each of the work pieces on said transport conveyor means at the respective work station; and

wherein said transport conveyor means includes a main transport conveyor on said outer frame,

a plurality of pallets sized to ride on said main transport conveyor, each for carrying one or more of the work pieces, and

a return conveyor for returning empty pallets from a terminal end of said working line to a starting end thereof, said return conveyor being supported on said outer frame under said transport conveyor, and

wherein said framed space in said outer frame is formed between said transport conveyor and said return conveyor;

wherein said transport conveyor and said return conveyor comprise, respectively, a pair of right and left conveying members provided in parallel to each other on both lateral sides thereof;

said outer frame comprises a plurality of supporting frames in portal shape provided at a predetermined pitch in the longitudinal direction of the working line, a pair of right and left guide members for said transport conveyor extendedly provided between upper portions of said supporting frames for guiding said conveying members of the transport conveyor, and a pair of right and left guide members for said return conveyor extendedly provided between lower portions of said supporting frames for guiding said conveying members of the return conveyor; and

said framed space is provided between said guide members for said transport conveyor and said guide members for said return conveyor.

5,160,012

CRANE SYSTEM WITH CONTINUAL CONVEYOR SYSTEM FOR MOVING DISCRETE ITEMS OF FREIGHT

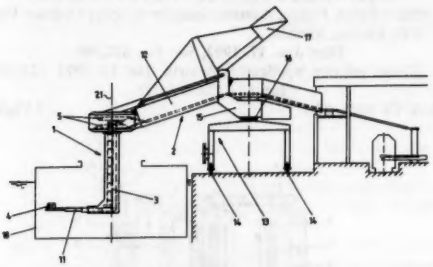
Hans Jonke, Schlüsselgasse 2/14, 1040 Wien, Austria

Filed Jan. 29, 1990, Ser. No. 471,201

Claims priority, application Austria, Feb. 2, 1989, 213/89

Int. Cl.[5] B65E *37/00, 47/46*

U.S. Cl. 198—369 40 Claims



1. A crane system for transporting discrete items of freight, which is adaptable for movement of freight in either an unloading or a loading direction, comprising:

a supporting crane structure;

a continual conveyor system supported by said crane structure, said continual conveyor system comprising,

a vertical conveyor which includes load carrying platforms and an upper and a lower end, said vertical conveyor being rotatably supported about a vertical axis by a traversing housing of said supporting crane structure,

means for rotating said vertical conveyor about the vertical axis,

a second conveyor having a first end and a second end with the first end of said second conveyor positioned adjacent said vertical conveyor such that the discrete items of freight being transported by said continual conveyor system traverse between a load carrying platform at the upper end of said vertical conveyor and the first end of said second conveyor,

a first circular conveyor surrounding said vertical conveyor, said first circular conveyor including an inclined, truncated conical freight support surface which subtends an angle other than 90° with respect to the axis of rotation of the vertical conveyor, said truncated conical support surface including an inner and outer edge,

means for rotating said first circular conveyor about the vertical axis,

a second circular conveyor positioned above said first circular conveyor, said second conveyor including an inclined, truncated conical freight support surface with an inner and an outer edge,

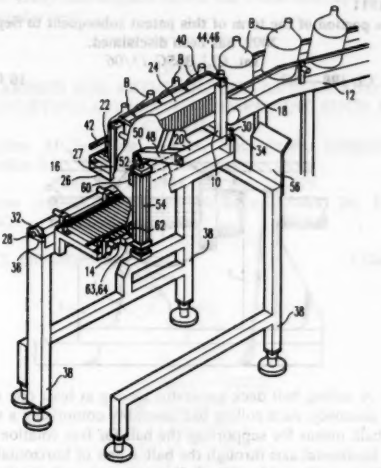
means for rotating said second circular conveyor about the vertical axis,

said second conveyor including switching means for switching the second end of said second conveyor from a first position wherein the second end of said second conveyor is adjacent the inner edge of the support surface of said first circular conveyor for freight transport therebetween to a second position wherein the second end of said second conveyor is adjacent the inner edge of the support surface of said second circular conveyor for freight transport therebetween, and said circular conveyors being dimensioned and arranged for rotating independently of a direction of movement or orientation of the vertical conveyor.

5,160,013
AUTOMATIC BOTTLE-TURNING MACHINE AND METHOD

James E. McDowell, Orange City, Fla., assignor to McDowell International Packaging Systems, Inc., Orlando, Fla.

Filed Oct. 7, 1991, Ser. No. 772,151
Int. Cl.[5] B65G 47/24
U.S. Cl. 198—412 13 Claims



1. An automatic bottle-turning system for turning upright bottles onto their sides, said system comprising:

a bottle-turning station having a longitudinal axis, said station being laterally rotatable about said longitudinal axis;

said station comprising a first support member and a second support member, said support members —

being generally planar;

having inner and outer edges running parallel to said longitudinal axis of said station;

being adjacent to one another along said inner edges; and

being disposed at a right angle to one another along said inner edges;

said station and said support members having proximate and distal ends;

rotation means for laterally rotating said station about said longitudinal axis, between an initial position in which said first support member is horizontal and said second support member is vertical, and a final position in which said first support member is vertical and said second support member is horizontal;

means for sending a full-station control signal when a predetermined number of bottles have entered said station onto said first support member;

means for receiving said full-station control signal and thereupon actuating said rotation means to rotate said station from said initial position to said final position;

means for sending a station-turned control signal when said station has reached said final position;

means for receiving said station-turned signal and thereupon discharging said bottles from said second support member via said distal end thereof;

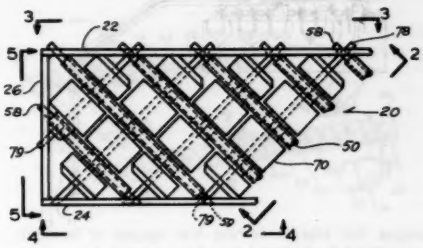
means for sending a station-empty signal when said predetermined number of bottles have exited via said distal end; and

means for receiving said station-empty signal and thereupon actuating said rotation means to rotate said station from said final position to said initial position.

5,160,014
CONVEYOR STRUCTURE FOR THE SIDEWALL OF A BOTTLE COMBINER

Lawrence J. Khalar, S. 86th W27660 Lakeview, Mukwanago, Wis. 53149

Filed Mar. 6, 1992, Ser. No. 847,405
Int. Cl.[5] B65G 47/12
U.S. Cl. 198—453 2 Claims



1. In combination with a conveyor system for moving substantially cylindrical workpieces, a conveyor structure for the sidewall of a bottle combiner for reducing frictional engagement of the substantially cylindrical workpieces with the surfaces of the sidewall and to prevent jamming of the movement of the substantially cylindrical workpieces, the conveyor structure comprising:

a top plate, a bottom plate, and an end plate;

a first plurality of roller bar means for rolling against the substantially cylindrical workpieces on said conveyor system;

a second plurality of roller bar means for rolling against said substantially cylindrical workpieces on said conveyor system;

each roller bar means of the first plurality of roller bar means having a width greater than the width of each roller bar means of the second plurality of roller bar means, and each roller bar means of the first plurality of roller bar means having at least one slot means for providing a slot through which each roller bar means of the second plurality of rollers passes through;

the first plurality of roller bar means having a first surface;

the second plurality of roller bar means having a second surface;

the first surface having a first point and the second surface having a second point; each point lying in a common plane;

the roller bar means of each plurality of roller bar means having at least two opposed ends;

the top plate, the bottom plate, and the end plate each having at least one receiving means for receiving at least one of the ends of each of the roller bar means of each of both the first and second plurality of roller bar means.

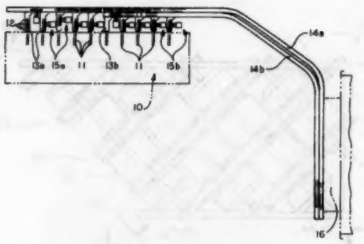
5,160,015
SWEEPOUT APPARATUS AND METHOD

Jack I. Perry, and Andrew B. Menzie, both of Toledo, Ohio, assignors to Owens-Brockway Glass Container Inc., Toledo, Ohio

Filed Sep. 9, 1991, Ser. No. 563,980
Int. Cl.[5] B65G 25/00
U.S. Cl. 198—468.01 5 Claims

1. A sweepout mechanism for moving newly formed glass containers from cooling deadplates of a series of glass forming machine sections to a machine conveyor system that is composed of two side-by-side conveyors running parallel to each other with a first conveyor extending beside the deadplates of the first half of the forming machine sections with the distance from the deadplates to the conveyor for the first half of the forming machine sections being greater than the distance from the deadplates of the other half of the forming machine sec-

tions to the second conveyor and wherein the deadplates are all the same distance from the forming machine sections, a sweepout head mounted adjacent each deadplate and all of the sweepout heads are of the same design and operation; the improvement comprising means connected to the sweepout heads of the first half of the forming machine sections for



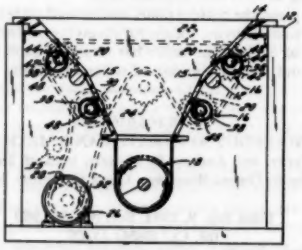
shifting the heads in the direction of the first conveyor as the sweepout engages the containers and during the continued movement of the sweepout as it moves the containers onto the first conveyor surface, said means for shifting the heads, shifting the vertical axis of the first half sweepout heads a distance which is equal to the relative spacing of the centerline of the first and second conveyors.

5,160,016

FEED HOPPER AGITATOR

Stephen L. Moksnes, Whitewater, Wis., assignor to AccuRate, Inc., Whitewater, Wis.

Filed Jan. 16, 1992, Ser. No. 821,219
Int. Cl.[5] B65G *47/20*
U.S. Cl. 198—533 **10 Claims**



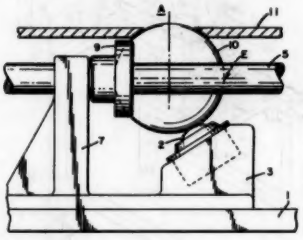
1. A feed hopper assembly for feeding granular material to a feed screw at the bottom of a hopper, the assembly including a frame, a resilient hopper mounted in said frame and a roller assembly positioned to engage one of the side walls of the hopper, said roller assembly comprising a shaft, a tubular roller mounted for rotation on the shaft and an eccentric drive assembly for rotating said roller assembly relative to the side wall of the hopper to thereby flex the side wall of the hopper to break up the granular material.

5,160,017

ROLLING BALL ASSEMBLY AND DECK

John G. Goodman, Alton, and Anthony Fernley, Lightwater, both of Great Britain, assignors to FMC Corporation, Chicago, Ill.

PCT No. PCT/GB89/00086, § 371 Date Sep. 18, 1990, § 102(e) Date Sep. 18, 1990, PCT Pub. No. WO89/07081, PCT Pub. Date Aug. 10, 1989
PCT Filed Jan. 27, 1989, Ser. No. 548,953
Claims priority, application United Kingdom, Jan. 28, 1988, 8801911
The portion of the term of this patent subsequent to Sep. 15, 2009, has been disclaimed.
Int. Cl.[5] B65G *13/06*
U.S. Cl. 198—789 **16 Claims**



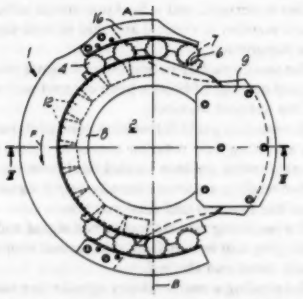
1. A rolling ball deck apparatus having at least one rolling ball assembly, each rolling ball assembly comprising a spherical ball, means for supporting the ball for free rotation about any horizontal axis through the ball; a pair of horizontal drive shafts, one either side of the ball; a collar on each driving shaft and a periphery of each collar being in driving engagement with the ball at or close to a horizontal plane through the equator of the ball, and between the horizontal axis of the ball perpendicular to the drive shafts and the horizontal axis parallel to the drive shafts whereby by rotating the drive shafts the ball may be rotated about any horizontal axis.

5,160,018

DEVICE FOR RETAINING CROWN CAPS

Rodiero Alieri, Imola, Italy, assignor to Sacmi Cooperativa Meccanici Imola S.c.r.l., Imola, Italy

Filed Oct. 15, 1991, Ser. No. 776,035
Claims priority, application Italy, Oct. 30, 1990, 3715 A/90
Int. Cl.[5] B65G *15/46*
U.S. Cl. 198—803.6 **2 Claims**



1. Device for retaining crown caps comprising a carousel for supporting and transferring said caps which comprises a disk which is rotatable about a vertical axis, said disk being peripherally provided with a series of angularly equidistant recesses which are open outwardly, the device further comprising a

stationary ring being superimposed on said disk, said stationary ring peripherally supporting a series of magnets which are positioned at least partially above said recesses, each one of said recesses having an upper protruding lip below which is defined an underlying semicircular seat for accommodating an edge of said caps, said magnets being accommodated in a peripheral cavity which is defined in said ring and which is open downwardly therefrom, said magnets being locked in said cavity by a thrust bearing which is fixed to said ring and which is partially superimposed on an inner side of said magnets, whereby said magnets attract and retain said caps in said semicircular seat.

5,160,019

CARRIER FOR ARTICLES SUCH AS EGGS AND CONVEYING APPARATUS COMPRISING SUCH A CARRIER

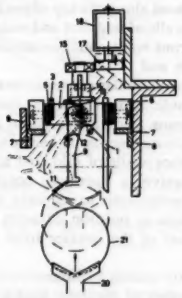
Leonardus J. Temming, Aalten, Netherlands, assignor to Staalkat B.V., Aalten, Netherlands

Filed Jul. 23, 1991, Ser. No. 734,679

Claims priority, application Netherlands, Jul. 24, 1990, 9001682

Int. Cl.[5] B65G *47/86*

U.S. Cl. 198—803.9 **4 Claims**



1. A carrier for articles, such as fruits and eggs, comprising:

a frame;

two gripper members mounted on the frame, with each having a free end so as to provide an opening for receiving an article between the free ends;

one gripper member being fixedly connected to the frame to provide a fixed gripper member and the other gripper member being pivotable relative to the fixed gripper member such as to provide a pivotable gripper member and such that an article can be received between the free ends and subsequently released therefrom;

the pivotable gripper member having two parts, both of which are mounted with a spring on a single shaft such that the two parts are pivotal relative to each other; and

the free end of said pivotable gripper member being provided with an oblique tab on an article feed-in side thereof for opening said pivotable gripper member when the article is received thereby.

5,160,020

DRIVE SYSTEM FOR ENDLESS BELT CONVEYORS WITH ROLLERS HAVING DRIVING, SUPPORTING AND ALIGNING FEATURES

James A. Thomas, Sr., Modesto, Calif., assignor to Lindberg Corporation, Rosemont, Ill.

Filed Nov. 9, 1990, Ser. No. 612,072

Int. Cl.[5] B65G *23/06*

U.S. Cl. 198—834 **28 Claims**

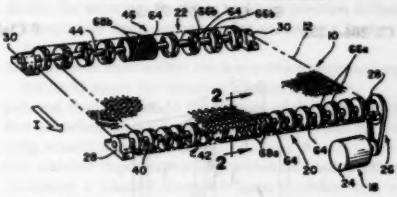
1. A drive for an endless conveyor belt having exposed, spaced segments at one surface of said belt comprising:

at least one roller defining a generally cylindrical outer peripheral surface and having a central longitudinal axis about which said roller rotates in normal use;

said roller including recesses in said peripheral surface to accommodate said belt segments therein, each of said recesses having an internal length;

each of said recesses including at least one side wall means, and a bottom wall means defined by a longitudinal surface extending substantially said length of said recesses,

said side wall means including at least one abutment surface



disposed to engage said portion of said belt segment within said recesses and said longitudinal bottom wall surface disposed to engage and support said belt segment within said recesses;

said abutment surfaces being of sufficient length and extending longitudinally at an acute angle to said longitudinal axis whereby said belt segment will be received in said recesses and engaged by said abutment surfaces in a supporting and centrally aligning relation when said conveyor belt is engaged on said roller.

5,160,021

LEAK-PROOF CYLINDRICAL CONTAINER FOR THE TRANSPORT OF DIAGNOSTIC SPECIMENS OR DANGEROUS SUBSTANCES

Barry Sibley, Site 16 A, Box 9, R.R. #1, Enfield Nova Scotia B0N 1N0, Canada, and Aka L. Char, Apt. 315, 15 Langebrae Dr., Halifax N.S. B3M 3W5, Canada

Filed Jul. 30, 1991, Ser. No. 738,160

Int. Cl.[5] B65D *81/16, 85/42*

U.S. Cl. 206—204 **19 Claims**

1. A leak-proof container for the transport of at least one vial containing diagnostic specimens, comprising:

a cylinder which includes a circular bottom wall and a sidewall integral with the bottom wall;

a cap which includes a circular top wall and a depending skirt that is sized to slide over the sidewall of the cylinder;

a radial groove in an outer surface of the sidewall that is spaced beneath a top edge of the sidewall and sized to retain an O-ring gasket for providing a pressure seal between the cylinder and the cap;

means for mechanically affixing the cap to the cylinder in a selectively releasable relationship, said means including at least one male part located on one of the cylinder and the cap and at least one female part located on a complementary region of the other of the cylinder and the cap, said one of a male part and a female part being located beneath the groove in the cylinder with respect to the top edge thereof; and

an absorptive insert sized to fit within the cylinder and support the at least one vial for diagnostic specimens and the like in a cushioned relationship spaced away from the bottom wall and the sidewall of the cylinder.

5,160,022

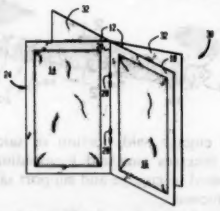
SAMPLE PACKET AND MEDIA MAILING SYSTEM

Louis P. Mennella, Princeton Junction, N.J., assignor to Flexpaq Corporation, South Plainfield, N.J.

Filed Jan. 2, 1992, Ser. No. 816,755

Int. Cl.[5] B65D *75/54*

U.S. Cl. 206—232 **9 Claims**



1. A mailable apparatus comprising:

a multi-compartment means having at least two cells for respectively containing a product sample;

a continuous, foldable sealing zone for separating said cells;

printable material having substantially the same size and shape as said multi-compartment means; and,

attaching means for attaching said printable material along said sealing zone to said multi-compartment means,

wherein said multi-compartment means and said printable material are folded at least once along said continuous, foldable sealing zone to approximately the size of a postcard so that said apparatus can be mailed through the U.S. postal service.

5,160,023

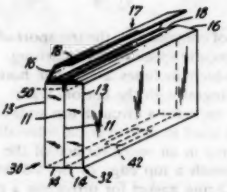
TWO CARTONS JOINED AS A SINGLE UNIT SEPARABLE INTO TWO SINGLE CARTONS

John M. Adams, Mechanicsville; Christopher N. Chance, Richmond; James A. DeBlasio, Midlothian; Donald H. Evers, Richmond; William C. Harris, Jr., Midlothian; Michael A. Kirby, Sr., Trevilians; Reginald W. Newsome; Xuan M. Pham, both of Richmond, and Robert E. Talley, Chester, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 774,529, Oct. 8, 1991. This application Dec. 19, 1991, Ser. No. 810,677

Int. Cl.[5] B65D *85/10*; **B65B** *35/30, 11/58*

U.S. Cl. 206—256 **25 Claims**



1. A dual cigarette carton for packaging a first number of cigarette packs and of dimensions compatible with commercially available tax-stamping machinery used in the automated processing of cigarette cartons, each said cigarette pack having a pair of opposed long walls and a pair of opposed short walls, said dual cigarette carton comprising:

first and second cartons each having four substantially vertical walls, an exterior top wall, and an exterior bottom wall; said four vertical walls including an interior front wall, an exterior rear wall substantially parallel and spaced from said interior front wall, and first and second exterior side walls connecting juxtaposed vertical edges of said interior front wall and said exterior rear wall; wherein:

said exterior rear wall has a first extension along the top edge thereof, said first extension being folded perpendicular to said exterior rear wall and extending towards said interior front wall, thereby forming said exterior top wall;

the widths of said interior front wall and said exterior rear wall are at least as wide as a second number of times the width of the long wall of said cigarette pack;

the widths of said exterior side walls are at least as wide as a third number of times the width of the short wall of said cigarette pack;

a fourth number of cigarette packs, equal to the product of said second number of times the width of the long wall of said cigarette pack and said third number of times the width of the short wall of said cigarette pack, can be positioned inside said

first carton with said short walls parallel said side walls; and

said first and second cartons are positioned adjacent one another with said interior front wall of said first carton coextensive with said interior front wall of said second carton such that the borders of said interior front walls are aligned; said dual cigarette carton further comprising:

a joining strip placed along the top edges of said coextensive interior front walls of said first and second cartons to join said interior front walls and, consequently, said first and second cartons; and

at least one substantially flat carrier means having a first side and a second side, and an adhesive borne on one side of said carrier means, said carrier means bearing said adhesive being positioned across at least one pair of adjacent, coplanar, exterior walls of said first and second cartons with said adhesive in operative contact with said last mentioned exterior walls to securely yet releasably connect said cartons in position adjacent one another such that the borders of the interior front walls are aligned; wherein:

said dual cigarette carton is dimensioned to contain twice the fourth number of cigarette packs, which is equal to said first number of cigarette packs.

5,160,024

CIGARETTE BOX WITH ATTACHED COUPON

Donald H. Evers, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 576,776, Sep. 4, 1990, abandoned. This application Sep. 26, 1991, Ser. No. 766,048

Int. Cl.[5] B65D *85/10*

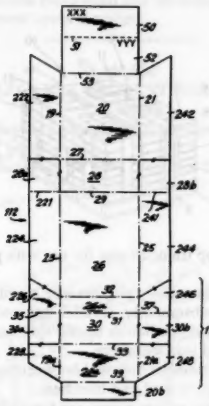
U.S. Cl. 206—268 **32 Claims**

1. A cigarette pack adapted to contain a plurality of cigarettes, said cigarette pack comprising:

a box-shaped outer member with four substantially vertical walls and a bottom wall, wherein said substantially vertical walls include an outer member front wall having first and second substantially vertical edges on each side thereof, a first substantially horizontal top edge along the top thereof, and a first substantially horizontal bottom edge along the bottom thereof; an outer member rear wall substantially parallel to and spaced form said outer member front wall, said outer member rear wall having third and fourth substantially vertical edges on each side thereof, a second substantially horizontal top edge along the top thereof, and a second substantially horizontal bottom edge along the bottom thereof, wherein said third substantially vertical edge is spaced form and juxtaposed to said first substantially vertical edge and said fourth substantially vertical edge is spaced from and juxtaposed to said second substantially vertical edge; an outer member first side wall extending between said first and third juxtaposed substantially vertical edges; an outer member

second side wall extending between said second and fourth juxtaposed substantially vertical edges; and a bottom wall extending between said first and second substantially horizontal bottom edge; and

a first panel connected to said outer member front wall along said first substantially horizontal top edge and having a first top edge, said first panel being free from attachment



to any part of said pack other than to said outer member front wall along said substantially horizontal top edge;

wherein said first top edge of said first panel is at most as high as said second substantially horizontal top edge of said outer member rear wall and said first panel lies in coplanar or a substantially parallel plane as said outer member front wall in said cigarette pack.

5,160,025

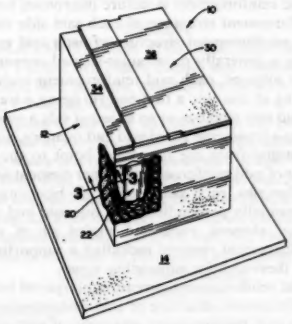
BATTERY SHIPPING CONTAINER

Michael A. Greenawald, McMurray, Pa., assignor to Uarco Incorporated, Barrington, Ill.

Filed Aug. 9, 1991, Ser. No. 743,117

Int. Cl.[5] B65D *85/42*

U.S. Cl. 206—333 **16 Claims**



1. A container for transporting wet batteries in aircraft, comprising:

a box portion having a selected width and a selected depth and further including

a lid structure in the top of the box portion,

means for securing the lid in a closed position defining a completely enclosed space for securing a battery for transport, and

an absorbent liner within the box portion surrounding the enclosed space for securing a battery; and

a pedestal base secured to the bottom of the box portion, said pedestal base having a width at least about 1.5 times the box portion selected width and a depth at least about 1.5 times the box portion selected depth.

5. A container for transporting wet batteries in aircraft, comprising:

a box portion including

a lid structure in the top of the box portion,

means for securing the lid in a closed position defining a completely enclosed space for securing a battery for transport, and

an absorbent liner within the box portion surrounding the enclosed space for securing a battery;

a pedestal base secured to the bottom of the box portion;

a first absorbent blanket within said box portion for wrapping around a battery; and

a first sealable impermeable bag within said box portion for enclosing a blanket-wrapped battery within said completely enclosed space during transport of the battery.

5,160,026

ADJUSTABLE LENGTH TOOL BOX FOR AUTOMOBILE REPAIR INCLUDING A PIVOTAL LEG

Daniel F. Marsh, 1240 Morey Cir., Hollister, Calif. 95023

Filed Sep. 16, 1991, Ser. No. 760,107

Int. Cl.[5] B65D *85/54*

U.S. Cl. 206—373 **10 Claims**

1. A tool box comprising an elongated tray having parallel longitudinal sides, a first end, a second end and a tray bottom, and a casing longitudinally slidable over said tray, said casing having an elongated top slightly larger than the width of said tray an elongated casing bottom substantially the same dimensions as said top, and casing side edges slightly wider than the depth of said tray interconnecting the longitudinal edges of said top and said casing bottom, the extent of extension of said tray from said casing being adjustable so that said tool box may rest on spaced supports, a leg, and means for mounting said leg on said tray bottom adjacent said first end for movement of said leg between a support position providing support for said first end and a retracted position.

5,160,027

HOLDER FOR A CASSETTE TAPE

Hans Wu, No. 78, Chung-Shan Wu St., Tainan City, Taiwan

Filed Dec. 18, 1991, Ser. No. 808,898

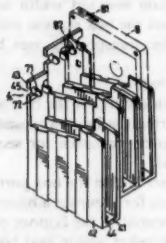
Int. Cl.[5] B65D *85/672, 85/62;* A47G *19/00*

U.S. Cl. 206—387 **4 Claims**

1. A holder for a cassette tape comprising:

a box having a closed bottom, an open top, a first and second opposed side walls, a third side wall interconnecting said first and second opposed side walls and an opening opposite said third side wall, each of said first and second side walls having an exterior including an elongated dovetail groove and an elongated dovetail projection alternatively provided thereon, said elongated dovetail projection of said first opposed wall adapted to be received in said elongated dovetail groove of said second long opposed wall and vice versa, said third side wall having a top portion higher than the height of said opposed side walls

and a pair of resilient tabs extends parallel with said long opposed side walls from said top portion of said third side



wall, each of said resilient tabs having a round projection extending one opposite the other.

5,160,028

MAGNETIC TAPE CASSETTE ACCOMMODATING CASE

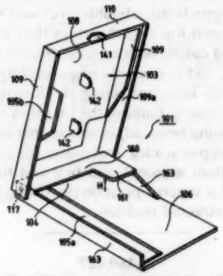
Kiyoo Morita, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 31, 1991, Ser. No. 815,169

Claims priority, application Japan, Jan. 10, 1991, 3-3351[U]; Jan. 24, 1991, 3-13316[U]; Mar. 25, 1991, 3-25184[U]

Int. Cl.[5] B65D *85/575*

U.S. Cl. 206—387 **3 Claims**



1. The magnetic tape cassette accommodating case for accommodating a single magnetic tape cassette comprising: a cover member having a pocket for receiving either a right or left end portion of said magnetic tape cassette, and a casing member having rotation stopper projections formed thereon, said cover member and said casing member being pivotably interconnected with one another, wherein said pocket receives either the right or left end portion of said cassette and allows said case to be opened and closed with a shorter side of said case as an axis of rotation, a pair of recesses for receiving a thick portion of said cassette being formed on said cover member and said casing member, with one of said recesses being formed as a long groove extending along the length of said case, and a cassette guiding side wall extending along the length of said cover member being formed on at least one end portion of said cover member and side walls of said pocket.

5,160,029

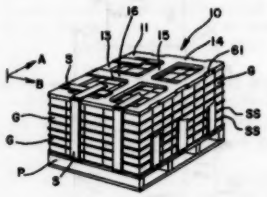
UNITARY TOP FRAME

Maurice J. Pigott, Winnetka; Brandon L. Pigott; Peter S. Pigott, both of Wilmette, and Schuyler F. Pigott, Arlington Heights, all of Ill., assignors to Nucon Corporation, Northbrook, Ill.

Filed Nov. 16, 1990, Ser. No. 614,903

Int. Cl.[5] B65D *85/48*

U.S. Cl. 206—453 **25 Claims**



15. A unitary top frame device for use with palletized goods comprising:

(a) a pair of substantially parallel side members;

(b) a pair of substantially parallel end members that are substantially perpendicular to said side members and connected to said side members;

(c) a first cross member disposed between said end members and connected to said end members;

(d) a second cross member disposed between said side members and connected to said side members;

(e) a substantially flat first surface; and,

(f) a second surface with a reinforcement structure projecting outwardly therefrom,

(i) said reinforcement structure of said side members, said end members and said cross members includes a plurality of longitudinal ribs with a plurality of transverse ribs disposed therebetween,

(ii) said reinforcement structure interposed between said reinforcement structure of said first cross member and said reinforcement structure of said second cross member being a generally X-shaped center reinforcement element, said center reinforcement element having a pair of angled ribs intersecting each other substantially in the middle and perpendicularly and at each of the four ends an end rib being a transverse rib of a said cross member,

(iii) said reinforcement structure interposed between said reinforcement structure of each said side member and said reinforcement structure of each said end member being a generally rectangular-shaped corner reinforcement element, each said reinforcement corner element having at one side a first end rib being a transverse rib of said side member, at an adjacent side a second end rib being a transverse rib of said end member, an angled rib extending from the innermost point to the outermost point of said reinforcement corner element and a pair of median ribs, each said median rib bisecting and being substantially perpendicular to one said end ribs of said corner element, each said angled rib of said corner reinforcement element including a supporting rib integral therewith for supporting a pad,

(iv) said reinforcement structure interposed between said reinforcement structure of said first cross member and each said reinforcement structure of said end member being a generally T-shaped first intermediate reinforcement element, each said first reinforcement intermediate element having at the first end a first end rib being a transverse rib of one said end member, at the second, opposite end a second end rib being a separate transverse rib of said one end member and at the third, intermediate end a third end rib being a transverse rib of said first cross member,

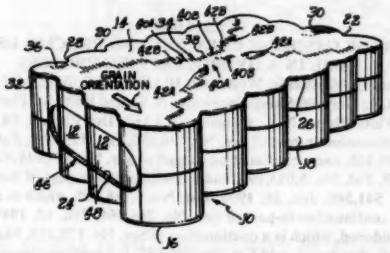
(v) each said reinforcement structure interposed between said reinforcement structure of said second cross member and said reinforcement structure of said each side member being a generally T-shaped second intermediate reinforcement element, each said second intermediate reinforcement element having at the first end rib being a transverse rib of one said side member, at the second, opposite end a second end rib being a separate transverse rib of said one side member and at the third, intermediate end a third end rib being a transverse rib of said second cross member.

5,160,030

TEARING SLIT ARRANGEMENT FOR A TEAR-APART PACKAGE

Michael A. Binsfeld, Chicago, Ill., assignor to Illinois Tool Works, Inc., Glenview, Ill.

Filed Jun. 19, 1991, Ser. No. 717,696
Int. Cl.[5] B65D *71/08*
U.S. Cl. 206—497 **5 Claims**



1. A package for releasably retaining a plurality of containers together as a unit comprising: side means for forming said package; said side means comprising a sheet of plastic material having a pre-determined grain orientation; a plurality of slits disposed on the side means; the slits having axes of elongation aligned substantially parallel to the pre-determined grain orientation of the material; the slits defining adjacent slit segments with adjacent slits being offset from each other primarily transversely of the pre-determined grain orientation; and the plastic material between the slits being selectively rupturable primarily in a direction transverse of the pre-determined grain orientation to release the containers from the package.

5,160,031

NESTABLE CONTAINER AND METHOD OF MAKING

Stephen P. Palisin, Jr., South Euclid, and Raymond J. Keller, Macedonia, both of Ohio, assignors to Berwick Manufacturing Inc., Cleveland, Ohio

Continuation of Ser. No. 495,856, Mar. 19, 1990, and a continuation of Ser. No. 495,853, Mar. 19, 1990, Pat. No. 5,040,682, which is a continuation-in-part of Ser. No. 271,157, Nov. 14, 1988, Pat. No. 4,909,393, and Ser. No. 270,123, Nov. 14, 1988, and Ser. No. 270,122, Nov. 14, 1988, and Ser. No. 299,957, Jan. 23, 1989, and Ser. No. 372,300, Jun. 23, 1989. This application Aug. 16, 1991, Ser. No. 746,480
The portion of the term of this patent subsequent to Aug. 20, 2008, has been disclaimed.
Int. Cl.[5] B65D *1/16*
U.S. Cl. 206—519 **35 Claims**

1. A nestable container that is formed as a product of a process utilizing an open-top metal work piece having sheet stock arranged in an uninterrupted ring-like band defining a side wall that extends with substantially uniform diameter between spaced ends, the side wall including a rim formation adjacent one of the ends for surrounding an opening that is of substantially the same diameter as the side wall, the work piece also having a metal sheet stock bottom wall connected circumferentially to and closing the other end and cooperating with the side wall to form an open-top work piece, the process comprising configuring the work piece into a container that has:

(a) first side wall portions that are substantially unchanged in configuration near the rim formation to maintain the opening unchanged in size and shape,

(b) second side wall portions that are tapered along at least a majority of the length of the side walls to diminish the diameter of the container as the side wall approaches the bottom wall,

(c) third side wall portions that extend between and provide a contiguous and uninterrupted connection between the first and second side wall portions,

(d) a plurality of tapered flute formations extending along the second side wall portions and being defined by a plurality of smoothly curved surfaces that are introduced into the second side wall portions to give the second side wall portions a tapered, fluted configuration that narrows in diameter as it approaches the bottom wall, the flute formations extending across the connection of the second side wall portions to peripheral portions of the bottom wall,

(e) the bottom wall having a substantially circular central portion thereof that is moved axially from the vicinity of the connection in a direction extending away from the rim formation to effectively elongate the container and to define a circular container bottom having an outer diameter that is smaller than is the diameter of the first side wall portions, peripheral portions of the bottom wall extending from the vicinity of the connection toward the central portion of the bottom wall being complexly configured transition surfaces that extend the flute formations downwardly from the vicinity of the connection and curve radially inwardly toward the central portion,

(f) the bottom wall including a depending ring-like formation circumferentially surrounding the central portion providing a contiguous and uninterrupted connection between the peripheral portions of the bottom wall and the central portion; and

(g) the side and bottom walls including their connection being imperforate such that the container has a fluid-carrying capability.

14. A nestable, open-top container comprising:

(a) a ring-like band of metal that extends about a central axis between an upper end region and a lower end region including:

(i) an upper section including a rim formation that surrounds an opening for introducing contents into and for removing contents from the container, the upper end section also including a substantially constant diameter first side wall portion that depends coaxially along the central axis from the rim formation;

(ii) a second side wall portion, the second wall portion being a fluted, tapered wall portion joined contiguously with the upper section and depending along the central axis from the section;

(iii) the fluted, tapered wall portion being spaced downwardly from the rim formation and extending to the lower end region;

(b) a bottom wall connected to the fluted, tapered wall portion and including an uninterrupted piece of metal having a central portion providing a container bottom transverse to and intersected by the central axis with the central portion being spaced beneath the fluted, tapered wall portion when the container is upright;

(c) the bottom having a peripheral portion joined contiguously with the central portion and providing a smooth transition between the container bottom and the fluted, tapered wall portion;

(d) the bottom wall means and the sidewall means having been formed during a die produced configuration of the side wall portion;

(e) the fluted, tapered wall portion having flutes and tapers

extending continuously from said upper section to said bottom connection, the flutes being joined with like produced flute extensions in the peripheral portion providing an upstanding side wall that is tapered and fluted along at least a majority of its length with a diminishing diameter from the upper section to the bottom; and

(f) at least a selected one of the side wall and the bottom being provided with ring-like formation located near a selected one of said upper and lower end regions of said sidewall, with the ring-like formation defining an inwardly facing trough that opens into the interior of the container, and with the ring-like formation being engageable to at least assist in supporting the container.

22. An apparatus for reconfiguring a generally cylindrical work piece having a generally cylindrical side wall of substantially uniform diameter extending between an open end defined by one end region of the side wall, and a closed end that is defined by a generally circular bottom wall that is connected to an opposed end region of the side wall circumferentially about the wall, to provide a container that is tapered to narrow in diameter along the length of its side wall with a plurality of circumferentially spaced, inwardly tapering ribs extending along a least a majority of the length of the side wall and extending across the connection of the side wall to the bottom wall and extending into portions of the bottom wall, such container being nestable within portions of a like container, comprising:

(a) die means having an open ended cavity of generally circular cross section for receiving the closed end region of the work piece, the cavity having a plurality of projections that taper inwardly for forming tapering ribs in the side wall and bottom wall of the container, and having bottom means configured for providing containers each with a depending ring-like support formation that surrounds a central region of the bottom wall;

(b) ram means for inserting into the work piece to engage portions of the inside surface of the bottom wall to force the container into the die cavity for reconfiguring the work piece by positioning the work piece for movement into the die cavity, and by forcing the ram into contact with interior surface portions of the bottom wall to force the work piece into the die cavity to form a container that is tapered narrowing in diameter along the length of its side wall, the container having a plurality of circumferentially spaced, inwardly tapering ribs extending along at least a majority of the length of the side wall and extending across the connection of the side wall to the bottom wall and extending to portions of the bottom wall to provide a container that is nestable within portions of a like container; and,

(c) the ram means being configured to cooperate with the die means for providing containers each with a depending ring-like support formation that surrounds a central region of the bottom wall of the container.

35. A method of forming a nestable container from a metal workpiece comprising:

(a) configuring the workpiece to form a generally cylindrical sidewall having a top rim formation along a top portion of said sidewall, said rim formation being of a first diameter and defining a container opening;

(b) configuring the workpiece to form a bottom wall having a generally truncated conical shape;

(c) further configuring said sidewall such that said sidewall tapers from said first diameter to a second diameter at a bottom seam which connects said sidewall to said bottom wall;

(d) forming a plurality of tapered flutes extending within said sidewall spaced from said rim formation and extending into said bottom wall; and,

(e) forming at least one ring-like formation extending within and around said sidewall, said formation defining an inwardly facing trough that opens into an interior of the container.

5,160,032

HYDROCARBON CONVERSION PROCESS USING ALUMINA CLAY COMPOSITIONS

Jennifer S. Holmgren, Bloomingdale; Stanley A. Gembicki, Clarendon Hills; Michael W. Schoonover, Arlington Heights, and Joseph A. Kocal, Gurnee, all of Ill., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 632,244, Dec. 20, 1990, Pat. No. 5,114,895, which is a continuation-in-part of Ser. No. 483,844, Feb. 22, 1990, abandoned. This application Dec. 16, 1991, Ser. No. 808,136

Int. Cl.[5] C10G *11/04*; C07C *2/66*

U.S. Cl. 208—46 **15 Claims**

1. A process for converting a hydrocarbon feed to a hydrocarbon converted product comprising contacting the hydrocarbon feed under hydrocarbon converting conditions with a catalyst consisting essentially of a layered clay homogeneously dispersed in an inorganic oxide matrix, such that the clay layers are completely surrounded by the inorganic oxide matrix, the inorganic oxide selected from the group consisting of alumina, titania, silica, zirconia, P_2O_5 and mixtures thereof.

5,160,033

OCTANE GASOLINE CATALYST AND PROCESS USING SAME IN A HYDROCRACKING PROCESS

James G. Vassilakis, Westmont, Ill.; Donald F. Best, Mahopac, N.Y.; Gary W. Skeels, Brewster, N.Y., and Edith M. Flanigen, White Plains, N.Y., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 596,157, Oct. 11, 1990, Pat. No. 5,095,169, and a continuation-in-part of Ser. No. 417,611, Oct. 5, 1989, Pat. No. 5,013,699, and a continuation-in-part of Ser. No. 541,580, Jun. 21, 1990, Pat. No. 5,116,794, which is a continuation-in-part of Ser. No. 366,264, Jun. 12, 1989, abandoned, which is a continuation of Ser. No. 175,333, Mar. 30, 1988, abandoned, said Ser. No. 596,157, is a continuation-in-part of Ser. No. 366,263, Jun. 12, 1989, abandoned, which is a division of Ser. No. 175,332, Mar. 30, 1988, abandoned, said Ser. No. 417,611, is a continuation-in-part of Ser. No. 178,901, Apr. 7, 1988, abandoned. This application May 1, 1991, Ser. No. 694,198

Int. Cl.[5] C10G *47/20*

U.S. Cl. 208—111 **4 Claims**

1. Process for hydrocracking a hydrocarbon feedstock which comprises contacting said feedstock in the presence of added hydrogen and at hydrocracking conditions with a catalyst composition comprising a zeolite Y, an activated zeolite beta and a hydrogenation component, said zeolite Y being prepared by the steps of

(a) ammonium ion-exchanging zeolite Y to lower its alkali metal content to less than 4.0 weight percent;

(b) hydrothermal steaming the low-sodium product of step (a) at a temperature of 550° C. to about 850° C. to reduce the unit cell dimension; and

(c) contacting the steam product of step (b) with a sufficient amount of an aqueous solution of ammonium ions having a pH of less than about 4.0 for a sufficient time to exchange at least some of the residual alkali metal cations for ammonium ions and to increase the bulk Si/Al_2 molar ratio of the zeolite composition to the range of 6.5 to 20;

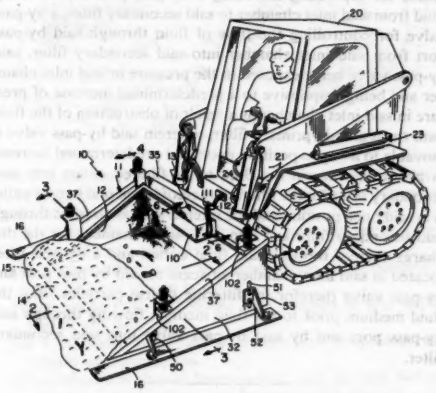
said activated zeolite beta being prepared by ion-exchanging the sodium and hydrogen form of zeolite beta in which the hydrogen cations are formed by the thermal decomposition of the organic templating cations, present in the as-synthesized form of zeolite beta, with a hydrogen-forming cation other than hydronium to reduce the sodium cation population to less than 25 equivalent percent and calcining the thus-exchanged zeolite in air or an inert atmosphere at a temperature effective to form an initial concentration of weak acid species and strong acid species, and continuing said heating to substantially reduce the concentration of strong acid species without substantially reducing the concentration of weak acid species.

5,160,034

VIBRATING BUCKET SCREEN FOR BEACHES

Robert J. Potter, Rte. 6, Box 544, Buffalo, Minn. 55313

Continuation of Ser. No. 531,783, Jun. 1, 1990, abandoned. This application Mar. 2, 1992, Ser. No. 845,761
Int. Cl.[5] B03C *1/30*
U.S. Cl. 209—38 23 Claims



1. A vibrating bucket screen attachment for picking up debris from a surface with particles, and for connection to the arm structure and hydraulic system of a mobile machine, comprising:

a) a frame having front, side, and rear portions and comprising:

1) mounting means for attachment to the arm structure and hydraulic system of the mobile machine;

2) support means for supporting the frame relative to the surface and engaging the surface at respective locations adjacent the side portions, the respective locations defining a generally horizontal plane; and

3) a blade on the front portion of the frame and having a generally horizontally extending elongate cutting edge for engaging the surface and picking up the debris and particles as the mobile machine is driven on the surface, the cutting edge being disposed in or below the plane defined by the support means; and

b) a vibrating separator bucket resiliently mounted within the frame to minimize transmission of vibrations to the frame, the bucket comprising:

1) vibration means for vibrating the bucket;

2) a pair of upwardly extending transversely walls and an upwardly extending rear wall between the transverse walls; and

3) a bottom vibrating particulate screen portion for screening the debris and particles flowing across the blade and into the bucket, the screen portion being fixed to the transverse and rear walls to form the bucket, the screen portion further being:

i) disposed rearwardly of and adjacent to the blade;

ii) spaced from the blade to aid in minimizing transmission of vibrations to the blade and frame; and

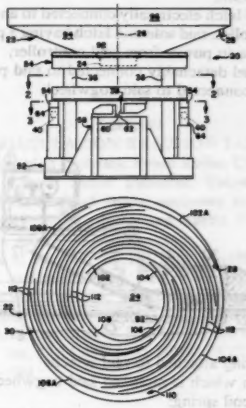
iii) disposed above the cutting edge of the blade and the plane defined by the support means such that the screen portion is spaced from the surface whereby the debris remains in the bucket and the particles pass through the screen portion to return to the surface.

5,160,035

PARTICLE CONCENTRATOR AND METHOD OF OPERATION

David P. McConnell, Apache Junction, Ariz., assignor to Cosmos Systems, Inc., Phoenix, Ariz.

Filed Apr. 26, 1990, Ser. No. 515,081
Int. Cl.[5] B03B *5/02, 5/06*
U.S. Cl. 209—439 23 Claims



1. A concentrator for separating particles of different densities, comprising:

a concentrator deck being an inverted annular having a frustoconical configuration and movable mounted on a supporting base,

outlet means for low density particles formed on a relatively lower central portion of the concentrator deck,

output means for high density particles formed on a relatively higher peripheral elevation portion of the concentrator deck.

riffle means angularly formed on the concentrator deck and inclining upwardly and radially outwardly for facilitating separation of particles thereon,

drive means for producing rotary oscillating movement of the concentrator deck about an axis perpendicular to the deck and in a direction for accelerating particles upwardly and radially outwardly along the riffles, and

stop means for periodically limiting travel of the deck so that momentum of higher density particles propels them more rapidly than lower density particles toward the high density outlet means.

5,160,036

AUTOMATIC POLLUTION CONTAINMENT AND ALERT APPARATUS FOR LIQUID DRAINAGES

Charles P. Childers, cody, Wyo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Oct. 15, 1991, Ser. No. 777,822
Int. Cl.[5] E02B *1/00*
U.S. Cl. 210—85 14 Claims

1. An apparatus for containing pollution within a liquid drainage, said apparatus comprising:

a) a first conduit for conveying liquid;

b) a second conduit comprising a tube having a liquid outlet and a liquid inlet, said liquid outlet being positioned within said first conduit;

c) a liquid barrier means for temporarily restraining and for guiding the flow of said liquid, said barrier means being connected to said second conduit;

d) means for lifting said liquid outlet of said second conduit

relative to said liquid inlet, said lifting means being connected to said liquid outlet of said second conduit; and

e) means for sensing pollution, said means for sensing being operatively connected to said lifting means so as to activate said lifting means in response to sensing said pollution.

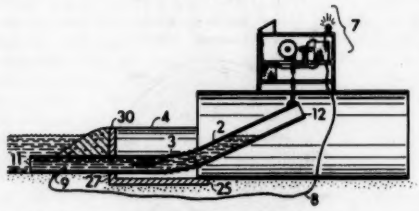
4. The apparatus of claim 1 wherein said means for lifting is comprised of:

a) an electronic controller, electrically connected to said sensing means, for receiving an activation signal from said sensing means;

b) a solenoid latch electrically connected to and powered by said controller, said solenoid latch having a pin retractable in response to power from said controller;

c) a cogwheel detachably connected to said pin;

d) a winch connected to said cogwheel;



e) a coil spring attached to said winch;

f) a shaft on which is mounted said cogwheel, said winch, and said coil spring;

g) an alarm electrically connected to and powered by said controller;

h) a battery electrically connected to said controller for powering said controller;

i) a solar charger electrically connected to said battery for charging said battery;

j) a flexible connector means attached at one end to said winch and attached at the other end to said liquid outlet of said second conduit;

k) a housing covering, coil spring, cogwheel, solenoid latch, shaft and outside of which are positioned said solar charger and said alarm.

5,160,037

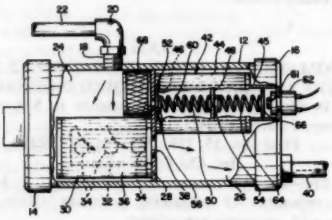
FILTER ASSEMBLY HAVING BY-PASS SYSTEM

Edward M. LeCour, Box 144, Shannock, R.I. 02875

Filed Mar. 7, 1991, Ser. No. 666,198

Int. Cl.[5] B01D *35/143*

U.S. Cl. 210—90 **5 Claims**



1. A filter assembly for filtering a fluid as received from a source, comprising a cylindrical housing having an inlet chamber and an outlet chamber located in said housing in coaxial relationship therewith, means for separating said inlet chamber from said outlet chamber, a fluid inlet located between the source of said fluid and said inlet chamber for directing said fluid to be filtered therein, a cylindrical primary filter positioned in said inlet chamber, the longitudinal axis of said primary filter being offset in parallel relation with respect to the longitudinal axis of said chamber, said primary filter including a filter material for receiving the fluid for filtering unwanted deposits therefrom, said outlet chamber being located in said housing adjacent to said primary filter, said means for separating including means for directing the filtered fluid from said primary filter to said outlet chamber, a fluid outlet located in said outlet chamber for directing the filtered fluid exteriorly of said housing, and a cylindrical secondary filter located in said housing within said outlet chamber, the longitudinal axis of said secondary filter being disposed in parallel offset relation with respect to the longitudinal axis of said primary filter, said means for separating including a by-pass port for directing fluid from said inlet chamber to said secondary filter, a by-pass valve for controlling the flow of fluid through said by-pass port from said inlet chamber into said secondary filter, said by-pass valve being exposed to the pressure in said inlet chamber and being responsive to a predetermined increase of pressure in said inlet chamber as a result of obstruction of the fluid path through said primary filter, wherein said by-pass valve is movable to an open position upon said predetermined increase in pressure, wherein the fluid to be filtered enters into said secondary filter for the filtering thereof when said bypass valve is in said open position and the filtered fluid is directed through said secondary filter and into said outlet chamber for the discharge thereof through said fluid outlet, and a by-pass filter located in said inlet chamber adjacent to said by-pass port and by-pass valve therefor for filtering coarse particles from the fluid medium prior to the fluid medium flowing through said by-pass port and by said by-pass valve into said secondary filter. .

5,160,038

WATER PURIFYING APPARATUS

Takashi Harada; Susumu Fujimura; Masahide Higashiyama, and Hidetoshi Tokita, all of Ichihara, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

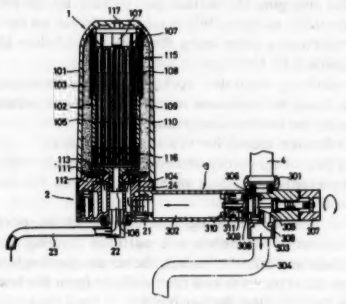
PCT No. PCT/JP90/00024, § 371 Date Sep. 9, 1991, § 102(e) Date Sep. 9, 1991, PCT Pub. No. WO91/10622, PCT Pub. Date Jul. 25, 1991

PCT Filed Jan. 11, 1990, Ser. No. 752,688

Claims priority, application Japan, Jun. 28, 1988, 63-160199; Jun. 28, 1988, 63-160200; Jun. 28, 1988, 63-160201

Int. Cl.[5] B01D *35/147*

U.S. Cl. 210—149 **6 Claims**



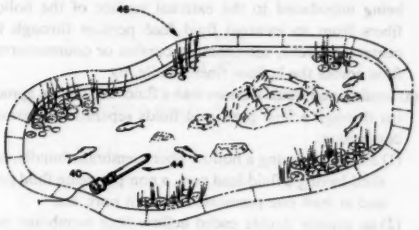
2. A water purifying apparatus comprising a block base having a raw water supplying portion and a purified water outlet portion, a water purifying cartridge removably mounted on said block base, and a hot water prevention means mechanism for automatically preventing the inflow of hot water having a temperature higher than 60° C. into said water purifying cartridge, said hot water prevention means being located in a raw water supplying passage to said block base.

5,160,039

BIO-TUBE AQUATIC FILTER

Perry Colburn, 15386 Little Valley Rd., Grass Valley, Calif. 95949

Filed Oct. 4, 1991, Ser. No. 771,742
Int. Cl.[5] C02F *3/06*
U.S. Cl. 210—150 13 Claims



1. A submersible filtration apparatus for cleansing water in aquatic-ponds through the digestion of lower order micro-organisms by aerobic bacteria, comprising:

(a) a generally cylindrical housing, said housing having a first end and a second end;

(b) a submersible pump, said submersible pump coupled to said first end of said housing;

(c) an intake port, said intake port coupled to said second end of said housing;

(d) a discharge port, said discharge port coupled to said submersible pump; and

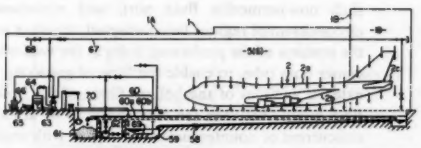
(e) a cylindrical-shaped bacteria bed, said bacteria bed enclosed by said housing, said bacteria bed including a plurality of substantially concentric layers of plasticized filter media, said filter media including a plurality of fibrous filaments, said bacteria bed supporting the growth of aerobic bacteria for digesting lower order micro-organisms.

5,160,040

CLEANING SYSTEM FOR USE IN TREATMENT OF EXCESS PAINT

Shiro Odawara, Oomiya; Keiichi Ito, Tokyo, and Kazushi Kobayashi, Asaka, all of Japan, assignors to Taikisha Ltd., Tokyo, Japan

Filed Jul. 11, 1991, Ser. No. 728,563
Claims priority, application Japan, Jul. 17, 1990, 2-188972
Int. Cl.[5] B01D *36/00*
U.S. Cl. 210—167 12 Claims



1. A cleaning system for use in treatment of excess paint, the system comprising:

a work area means for cleaning excess paint by trapping the excess paint in a cleaning liquid, a collecting gutter being provided in a floor of said work area, substantially directly underneath an object to be painted, for collecting the cleaning liquid containing the excess paint in the form of paint sludge;

a collecting device which includes a filter conveyor operable to collect the sludge, said filter conveyor including an endless rotary device and a winding type filter which is conveyed by and extends along said endless rotary device, wherein said winding type filter will filter and carry a portion of the paint sludge from the cleaning fluid collected in said collecting gutter;

said collecting device positioned within said collecting gutter including said winding type filter which filters the cleaning liquid introduced into the gutter; and

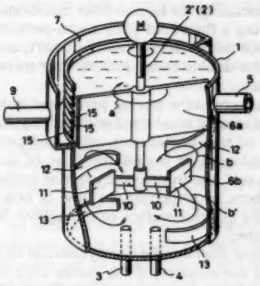
a sludge tank positioned adjacent said filter conveyor of said collecting device for collecting the paint sludge carried by said winding type filter of said filter conveyor.

5,160,041

COAGULATION REACTION TANK

Naohiro Taniguchi, Yokohama; Syuzo Koike, Urawa; Yasuhiko Watanabe, Tokyo; Tadao Takeuchi, Tokyo, and Noboru Fujiwara, Tokyo, all of Japan, assignors to Japan Sewage Works Agency, Tokyo, Japan and Kurita Water Industries Ltd., Tokyo, Japan

Continuation of Ser. No. 702,290, May 20, 1991, abandoned, which is a continuation of Ser. No. 499,345, filed as PCT/JP88/01321, Dec. 23, 1988, Pat. No. 5,069,784. This application Mar. 24, 1992, Ser. No. 858,438
Claims priority, application Japan, Dec. 25, 1987, 62-327190
Int. Cl.[5] C02F *1/52*; B01D *29/075*
U.S. Cl. 210—205 1 Claim



1. A coagulation reaction tank comprising:

a cylindrical tank;

rotary stirring means comprising a rotary shaft positioned in a central part of said cylindrical tank, an upper stirring vane forming a flat plate having a uniform vertical width and mounted on said rotary shaft so that a distance of about 5 to 20 mm is defined between an outer edge of said upper stirring vane and an inner wall of said cylindrical tank, and a lower stirring vane mounted on said rotary shaft and having a base part defining a first vertical width and a free end part defining a second vertical width which is larger than said first vertical width, said rotary stirring means stirring sludge and a coagulant located within said cylindrical tank and converting the sludge into floc;

a filtration tank mounted outside an upper outer peripheral wall of said cylindrical tank, said upper outer peripheral wall of said cylindrical tank comprising a plurality of slits having a vertical width of not more than 5 mm for admitting liquid from within said cylindrical tank in the form of filtrate and discharging said filtrate out of said cylindrical tank; and

guide plates disposed above and below said lower stirring vane within the cylindrical tank for enhancing the stirring efficiency.

5,160,042

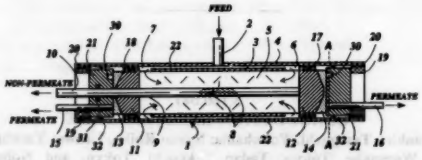
DOUBLE ENDED HOLLOW FIBER BUNDLE AND FLUIDS SEPARATION APPARATUS

Benjamin Bikson, Brookline, and Salvatore Giglia, Norwood, both of Mass., assignors to Praxair Technology, Inc., Danbury, Conn.

Filed Nov. 5, 1991, Ser. No. 787,898

Int. Cl.[5] B01D *63/02*

U.S. Cl. 210—321.8 **29 Claims**



1. A fluids separation apparatus containing a hollow fiber membrane bundle, wherein permeate fluid can be withdrawn from both ends of the hollow fiber bundle while maintaining either concurrent or countercurrent fluid flow throughout the bundle, comprising:

means for enabling withdrawal of permeate fluid from both ends of the hollow fiber membrane bundle, and for enabling the introduction of feed fluid to the external surface of the hollow fibers, from an external fluid feed port, or through the center core tube, for either co-current or countercurrent flow across the hollow fiber bundle, including,

(a) a shell enclosing the hollow fiber membrane bundle, said shell having a fluid feed port, a non-permeate fluid port, and at least one permeate fluid exit port; and

(b) an annular double ended hollow fiber membrane bundle comprising:

(i) a center core tube having perforated holes in the wall thereof located at selected points along the longitudinal length of said center core tube, said perforated holes being adapted to permit the flow of feed fluid from within said one tube to the exterior surface of the hollow fibers, or to permit the flow of non-permeate gas from the exterior surface of the hollow fibers into said core tube;

(ii) a hollow fiber bundle in a cylindrical shape positioned around the exterior of the center core tube, with the hollow fibers extending essentially the length of the interior of the shell with both ends of the fibers embedded in, and extending between and through, tubesheets in fluid tight relationship thereto, with the open bores of the hollow fibers opening on the exterior surfaces of said tubesheets for withdrawal of permeate from both ends of the hollow fiber bundle;

(iii) an essentially impermeable film barrier encasing the entire longitudinal length of the exposed hollow fibers of the hollow fiber bundle between the tubesheets, except for selected non-encased circumferential regions adapted to direct the flow of feed fluid to the exterior surface of the hollow fibers from a shell fluid feed port, or to permit the flow of non-permeate gas from the exterior surface of the hollow fibers to a shell non-permeable fluid port, said non-encased circumferential regions being adapted, together with the position of the perforated holes in the wall of the of the center core tube, to enable the flow of gas along the exterior surfaces of the hollow fibers of the hollow fiber bundle between the tubesheets to be in either concurrent or countercurrent flow with respect to the flow of gas within the center core tube; and

(iv) tubesheets encapsulating both ends of said bundle, with the center core tube extending and communicating through one of said tubesheets to permit the flow of feed fluid or non-permeate gas therethrough, with said hollow fiber membrane bundle positioned within the shell in fluid tight relationship between the shell and the bore sides of said hollow fiber bundle.

15. A process for separating and enriching a first component from a fluids mixture thereof such at least one other component of said mixture, comprising:

enabling withdrawal of permeate gas from both ends of the hollow fiber membrane bundle, with the fluids mixture being introduced to the external surface of the hollow fibers from an external fluid feed port or through the center core tube, for either co-current or countercurrent flow across the hollow fiber bundle, by

(a) feeding said fluids mixture into a fluids separation apparatus through a feed port, said fluids separation apparatus comprising:

(1) a shell enclosing a hollow fiber membrane bundle, said shell having a fluid feed port, a non-permeate fluid port, and at least one permeate fluid exit port; and

(2) an annular double ended hollow fiber membrane bundle comprising:

(i) a center core tube having perforated holes in the wall thereof located at selected points along the longitudinal length of said center core tube, said perforated holes being adapted to permit the flow of feed fluid from within said center core tube to the exterior surface of the hollow fibers, or to permit the flow of non-permeate gas from the exterior surface of the hollow fibers into said center core tube;

(ii) a hollow fiber bundle in a cylindrical shape positioned around the exterior of the center core tube, with the hollow fibers extending essentially the length of the interior of the shell with both ends of the fibers embedded in, and extending between and through, the tubesheets in fluid tight relationship thereto, said hollow fibers being capable of selectively permeating said first component, with the open bores of the hollow fibers opening on the exterior surfaces of said tubesheets for withdrawal of permeate from both ends of the hollow fiber bundle;

(iii) an essentially impermeable film barrier encasing the entire longitudinal length of the exposed hollow fibers of the hollow fiber bundle between the tubesheets, except for selected non-encased circumferential regions adapted to direct the flow of feed fluid to the exterior surface of the hollow fibers from a shell fluid feed port, or to permit the flow of non-permeate gas from the exterior surface of the hollow fibers to a shell non-permeable fluid port, said non-encased circumferential regions being adapted, together with the position of the perforated holes in the wall of the center core tube, to enable the flow of gas along the exterior surfaces of the hollow fibers of the hollow fiber bundle between the tube sheets to be in either concurrent or countercurrent flow path with respect to the flow of gas within the center core tube; and

(iv) tubesheets encapsulating both ends of said bundle, with the center core tube extending and communicating through one of said tubesheets to permit the flow of feed fluid or non-permeate gas therethrough, with said hollow fiber membrane bundle positioned within the shell in fluid tight relationship between the shell and the bore sides of said hollow fiber bundle;

(b) removing non-permeate gas from the fluids separation apparatus through a non-permeate port; and

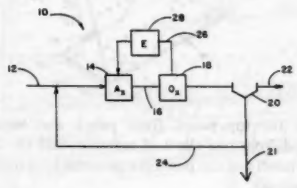
(c) recovering said first component permeate gas through at least one permeate recovery port.

5,160,043

METHOD OF EXHAUSTING DISSOLVED OXYGEN IN A NITROGEN REMOVAL WASTEWATER TREATMENT PROCESS

Peter Kos, Ridgefield, Conn., assignor to I. Krüger, Inc., Cary, N.C.

Filed Sep. 9, 1991, Ser. No. 756,501
Int. Cl.[5] C02F *3/30*
U.S. Cl. 210—605 4 Claims



1. A method of exhausting dissolved oxygen in a nitrogen removal wastewater treatment process comprising the steps of:

(a) forming a mixed liquor;

(b) denitrifying the mixed liquor by treating the same in an anoxic treatment zone;

(c) transferring the mixed liquor from the anoxic treatment zone to an oxic treatment zone and nitrifying the mixed liquor; and

(d) recycling a portion of the nitrified mixed liquor from the oxic treatment zone back to a preceding anoxic zone;

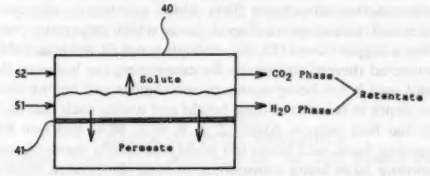
said recycling step including the steps of transferring the nitrified mixed liquor from the oxic zone to an exhauster holding tank located in a recycle stream, retaining the nitrified mixed liquor in the exhauster holding tank in the absence of supplied oxygen containing gas for a predetermined period to reduce the dissolved oxygen concentration of the mixed liquor, and transferring the deoxygenated, nitrified mixed liquor from the exhauster holding tank to the anoxic zone.

5,160,044

PROCESS FOR SEPARATING ETHANOL FROM AQUEOUS SOLUTION

Chung-Sung Tan, Taipei, Taiwan, assignor to National Tsing Hua University, Hsingchu, Taiwan

Filed Feb. 20, 1992, Ser. No. 839,206
Int. Cl.[5] B01D *11/00, 61/00*
U.S. Cl. 210—634 7 Claims



1. A process for separating ethanol from an aqueous solution by supercritical or near supercritical extraction in combination with reverse osmosis comprising contacting an ethanol containing aqueous solution with one side of a reverse osmosis membrane in the presence of a supercritical or near supercritical CO_2 having a pressure of 72.8–88.4 atm and a temperature of 26.5°–34° C., wherein the volumetric ratio of CO_2 to said ethanol containing aqueous solution at said pressure and temperature is higher than 1.8, and recovering a permeate solution having an ethanol concentration lower than that of said ethanol containing aqueous solution from the opposite side of said membrane.

5,160,045

PROCESS FOR REMOVING ELEMENTAL SULFUR FROM FLUIDS

Robert J. Falkiner, Mississauga; Marc A. Poirier, and Ian D. Campbell, both of Sarnia, all of Canada, assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Jun. 17, 1991, Ser. No. 716,485
Int. Cl.[5] B01D *11/00*
U.S. Cl. 210—634 10 Claims

1. A process for reducing the elemental sulfur content of a fluid containing same, comprising mixing said fluid without the addition of an aromatic mercaptan with water, inorganic caustic and a sulfide in amounts effective to form after completion of mixing an aqueous layer containing polysulfides and a fluid layer having a reduced elemental sulfur level and recovering the treated fluid.

5,160,046

MEMBRANE SEPARATION PROCESS

Mordechai Pasternak, Spring Valley, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Filed Nov. 18, 1991, Ser. No. 793,900
Int. Cl.[5] B01D *61/36*
U.S. Cl. 210—640 25 Claims

1. The method which comprises

passing a charge aqueous solution of an organic oxygen-containing liquid component which is soluble in water into contact under pervaportion conditions with, as pervaporation membrane, a non-porous separating polyimine polymer layer which has been interfacially cross-linked with a polyisocyanate or with a poly(carbonyl chloride) cross-linking agent;

maintaining a pressure drop across said membrane thereby forming a high pressure retentate containing increased content of organic oxygen-containing component and decreased content of water and a low pressure permeate of increased content of water and decreased content of organic oxygen-containing component;

maintaining the pressure on the low pressure discharge side of said membrane below the vapor pressure of said permeate thereby maintaining said permeate in vapor phase;

maintaining the pressure on the high pressure retentate side of said membrane above the vapor pressure of said charge aqueous solution and of said retentate and thereby maintaining said charge aqueous solution and said retentate in liquid phase;

recovering said permeate of increased content of water and decreased content of organic oxygen-containing component, in vapor phase from the low pressure discharge side of said membrane; and

recovering said retentate of increased content of organic oxygen-containing component and decreased content of water, in liquid phase from the high pressure side of said membrane.

5,160,047

GLUTARALDEHYDE FOR CONTROLLING ZEBRA MUSSELS

Robert E. McCarthy, Naperville, Ill., assignor to Nalco Chemical Company, Naperville, Ill.

Filed Feb. 18, 1992, Ser. No. 836,473
Int. Cl.[5] C02F *1/50*
U.S. Cl. 210—749 2 Claims

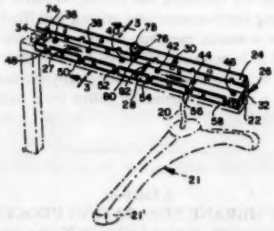
1. A method for controlling macrofouling caused by the attachment of Zebra mussels to surfaces in contact with industrial process waters which contain Zebra mussels which comprises treating these waters with from 5 to 50 parts per million of glutaraldehyde.

5,160,048

GARMENT ANTI-THEFT DEVICE

Roger J. Leyden, Willow Springs, and Terrance Surma, Bloomingdale, both of Ill., assignors to Se-Kure Controls, Inc., Chicago, Ill.

Filed Dec. 30, 1991, Ser. No. 814,483
Int. Cl.[5] A47F 5/00
U.S. Cl. 211—7 **20 Claims**



1. A garment anti-theft device for captively receiving at least one clothes hanger of the type having a hook with a free distal end, the hook being configured to receive a support arm of a clothes rack to suspend the hanger in an operative position, the anti-theft device comprising:

a body having a top and bottom and a wall with at least one opening extending vertically therethrough of a size large enough to receive a free distal end of a hook of a hanger introduced by movement of the hanger free distal end in a first direction into the opening;

a cover;

means for attaching the cover to the body for movement selectively between an open position and a securing position,

the cover, in its open position, allowing the free distal end of a clothes hanger to be directed a) in a first direction into the body opening so that the hanger is supported in an operative position on at least one of a support arm on a clothes rack and the body and b) out of the opening by movement of the free distal end of the hanger oppositely to said first direction,

the cover in its securing position blocking a hanger in its operative position so as to prevent a free distal end of a hanger in the operative position from being moved oppositely to the first direction out of the body opening; and

means for locking the cover to the body in its securing position.

5,160,049

TRANSPARENT STAND FOR PIERCED EARRINGS

Curtis E. McMillen, Jr., 6302-231st St. SW., Mountlake Terrace, Wash. 98043

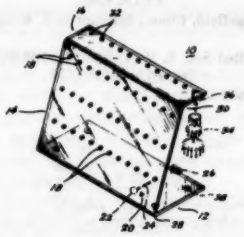
Filed May 1, 1991, Ser. No. 694,459
Int. Cl.[5] A47F 7/00
U.S. Cl. 211—13 **6 Claims**

1. A stand for holding pierced earrings which have a stud, a post, and a removable back, comprising:

a front panel having a plurality of paired holes sized for insertion of the post of a pierced earring without allowing the stud of a pierced earring to pass through the hole, a top edge portion, and a bottom edge portion, and being sufficiently thin to allow the back of a pierced earring to be attached to the post of a pierced earring while the post is in a hole;

a base panel having a front edge portion which is joined to the bottom edge portion of the front panel so that the base panel and front panel are joined at an acute angle;

a top panel having a front edge portion joined to the top edge portion of the front panel, and having a plurality of paired holes sized for insertion of the post of a pierced earring without allowing the stud of a pierced earring to pass through the hole; and



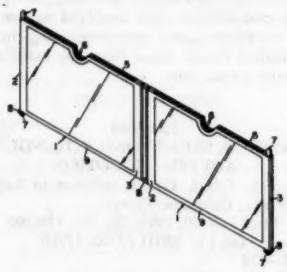
wherein the top panel, front panel, and base panel are formed from one sheet of material, and the holes in the front panel and top panel are between 1/16 inch and ¼ inch in diameter.

5,160,050

MODULAR APPARATUS USED FOR THE ORDERLY DISPLAY, IN PARTICULAR, OF ADVERTISING FLIERS ACCOMPANYING VIDEOCASSETTES, VIDEOCASSETTES THEMSELVES, OR LIKE MATERIALS

Vincenzo Russo, Via Caboto No. 8, 15011 Acqui Terme, Alessandria, Italy

Filed May 2, 1990, Ser. No. 517,759
Claims priority, application Italy, May 2, 1989, 8604 A/89
Int. Cl.[5] A47G 29/00
U.S. Cl. 211—40 **14 Claims**



1. A modular apparatus used for the orderly display of videocassettes, advertising fliers which accompany videocassettes and videocassette-shaped items which apparatus comprises a support stand (13, 30), multiple boxes (1, 60) attachably connected thereto and means for connecting the boxes to the stand, said boxes being square or rectangular and having shallow depth in relation to their height and width, such that each box has four narrow edges (2, 3, 9, 60.3, 60.4) and two flat opposing faces, said boxes are made of a sturdy material, said opposing faces being transparent, at least the bottom narrow (9) edge and one vertical narrow edge (2, 3, 60.3, 60.4) but not more than three narrow edges are sealed in such a way that the sealed narrow edges and said opposing faces enclose one or more housing spaces in which said videocassettes, fliers or videocassette-shaped items can be held and can be inserted or removed through the non-sealed narrow edge or edges and in which each box is connected by said connecting means to said support stand to swing on an axis substantially coinciding with one vertical narrow edge (2, 60.3) of each box, characterized in that each box (1, 60) is comprised to two semi-boxes (1', 1") identical to one another that fit together substantially at a middle plane parallel to the opposing faces of the box itself.

5,160,051

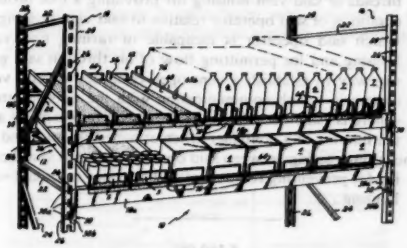
STORAGE RACK SHELVING SYSTEM

Rafael T. Bustos, Alpharetta, Ga., assignor to Leggett & Platt, Incorporated, Carthage, Mo.

Continuation of Ser. No. 307,837, Feb. 7, 1989, abandoned. This application Aug. 3, 1990, Ser. No. 562,476

Int. Cl.[5] A47F 5/00

U.S. Cl. 211—59.2 10 Claims



1. A warehouse-style merchandising shelving system for displaying consumer products on gravity-feed shelves for retail sale, which system comprises

a plurality of vertical corner posts, each of said corner posts having a plurality of vertically and equidistantly spaced slots formed therein, said corner posts being arranged in pairs with a front one of each of said pairs of corner posts being located at the front of said shelving system and a rear one of each of said pairs of corner posts being located at the rear of said shelving system,

side support bars extending front to rear between each of said pairs of corner posts,

a plurality of pairs of crossbars, each of said pairs of crossbars comprising a front crossbar and a rear crossbar,

each front crossbar extending between two front corner posts, each of said front crossbars having connector means formed on its opposite ends, said connector means of said front crossbars being received within said vertical slots of said front corner posts,

said rear crossbar extending between two of said rear corner posts, said rear crossbar having connector means formed on its opposite ends, said connector means of said rear crossbar being received within said vertical slots of said rear corner posts, said rear crossbar being located above the front crossbar of each pair of crossbars,

a plurality of channel-shaped sheet metal racks extending between and supported from each of said pairs of crossbars, each of said racks having a downwardly and forwardly sloping bottom wall and a pair of sidewalls extending in a vertical plane from said bottom walls, and

a low-friction slip-surface track located within each of said racks, said track having a width approximately equal to the distance between said sidewalls and a length approximately equal to the length of said racks.

5,160,052

SHELF SUPPORT ASSEMBLY

Michael Wudka, 5711 Ravenspur Dr. No. 311, Rancho Palos Verdes, Calif. 90274

Filed Oct. 31, 1991, Ser. No. 785,481

Int. Cl.[5] A47F 5/00

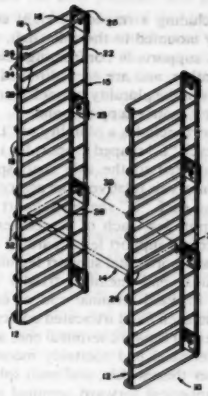
U.S. Cl. 211—90 11 Claims

1. A shelf support assembly for an adjustable shelving support system, comprising:

a) at least two elongated, vertical support members, each having a first side and a second side;

b) a plurality of substantially U-shaped, horizontal, support members in spaced parallel relationship along at least a portion of the length of each said vertical support member, said horizontal support members each comprising a base portion with first and second arms depending therefrom, the ends of each of said first arms being securely connected to said first side of said vertical support member and the ends of each of said second arms being securely connected to said second side of said vertical support member; and

c) at least two vertically disposed, elongated, connecting members, each securely attached to the base portions of said U-shaped, horizontal support members of a respective



support member to provide rigidity of said shelf support assembly,

wherein, when said at least two support assemblies are positioned in spaced, planar relationship to each other at a desired distance to accommodate a shelf, such a shelf may be supported at a first end by at least one arm of one of said U-shaped, horizontal support members and at a second end by at least one arm of an associated U-shaped, horizontal support member on the other support assembly.

5,160,053

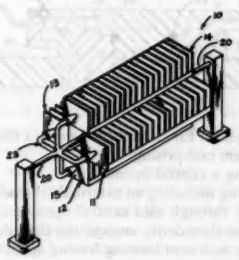
ROTATING DISC SUPPORT RACK

Thomas S. Graham, 119 Richmond Cir., Pittsburgh, Pa. 15237, and Todd R. McAliley, 2105 Straubs La., Pittsburgh, Pa. 15212

Filed May 2, 1991, Ser. No. 694,941

Int. Cl.[5] A47F 5/00

U.S. Cl. 211—164 3 Claims



1. A rotating disc support rack, comprising in combination, a plurality of rack members, wherein the plurality of rack members includes a first, second, third, and fourth respective rack member, each rack member arranged parallel and coextensively relative to one another, with the rack members defining a tunnel spacing between the rack members in an assembled configuration, and each rack member

including spaced planar end walls defined by a first height, a floor coextensively directed between the end walls, and side walls positioned on each side of the end walls defined by a second height less than the first height, and

a plurality of partition walls spaced apart a predetermined spacing and defined by the first height to accommodate audio disc members between the partition walls, and

an axle shaft directed through the tunnel spacing, and

a respective right and left support post rotatably mounting respective right and left terminal ends of the axle shaft, and

the axle shaft including a respective right and left matrix support fixedly mounted to the axle shaft, with the right and left matrix supports in confronting relationship relative to one another, and are each directed to secure opposed end walls of the plurality off rack members between the right and left matrix supports, and

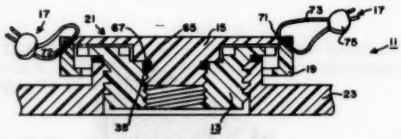
each matrix support includes a plurality of "L" shaped support legs, and each "L" shaped support leg is orthogonally and fixedly mounted to the axle shaft spaced apart at ninety degree intervals relative to an adjacent "L" shaped support leg, and each "L" shaped support leg includes a horizontal support leg, each of a predetermined length, and each horizontal support leg is parallel relative to one another, and each horizontal support leg including a fixed truncated conical end member fixedly and coaxially mounted to a forward terminal end of each horizontal support leg, and each fixed truncated conical end member includes a spherical forward terminal end, and each spherical forward terminal end rotatably mounts a spherical support member therewithin, and each spherical support member and spherical forward terminal end includes a helical lubricant groove directed about the fixed truncated conical end member, and each fixed truncated conical end member further includes a conical sleeve positioned in surrounding relationship relative to the helical lubricant groove and the spherical support member and the semi-spherical forward terminal end, and each end wall includes an end wall recess medially directed within each end wall of each rack member, and each spherical support member is rotatably mounted within each end wall recess.

5,160,054

TAMPER EVIDENT VENT SYSTEM FOR CONTAINERS

Paul A. Nolte, Memphis, Tenn., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Apr. 22, 1991, Ser. No. 688,446
Int. Cl.[5] B65D *51/16*
U.S. Cl. 220—374 **10 Claims**



1. A vent system for containers having a threaded opening, said vent system comprising:

a ring having a central opening;

a vent housing including an externally threaded neck portion extending through said central opening of said ring and adapted to threadedly engage the threaded opening of a container, said vent housing having an internally threaded central opening;

a cap including an externally threaded stem;

a passageway extending through said vent system for the passage of air therethrough;

a tamper evident sealing means for locking said cap and said ring together to establish a turnable manual operator, said cap and ring being in a locked condition for blocking access to said vent housing to prevent removal of said vent housing from a container when attached thereto, said operator being turnable in one direction to a first position in which said externally threaded stem is threadedly engaged with said internally threaded central opening of said vent housing for blocking off flow of air through said passageway to establish a vent closed condition of said vent system and turntable in the opposite direction to a second position in which at least a portion of said externally threaded stem is threadedly disengaged from said threads of said vent housing for providing a free turning condition of said operator relative to said vent housing in which said operator is incapable of turning said vent housing and for permitting flow of air through said passageway to establish a vent open condition of said vent system in which communication with the outside atmosphere is established between the outside atmosphere and the interior of a container when attached thereto; and

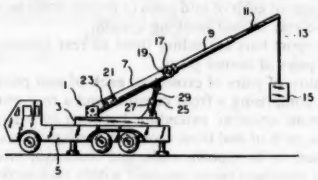
means interacting between said operator and said vent housing for preventing removal of said operator from said vent housing.

5,160,055

LOAD MOMENT INDICATOR SYSTEM

Gregory G. Gray, Hagerstown, Md., assignor to JLG Industries, Inc., McConnellsburg, Pa.

Filed Oct. 2, 1991, Ser. No. 769,783
Int. Cl.[5] B66C *13/48*
U.S. Cl. 212—150 **17 Claims**



1. In a crane having a load bearing cable, a base, a boom pivotally mounted to said base, and a hydraulic cylinder having a cylinder and a piston rod for raising and lowering said boom, a load moment indicator system comprising:

means for generating a first signal which is indicative of an angle between said boom and said base;

means for generating a second signal which is indicative of a length of said boom;

a strain sensor embedded in said piston rod for generating a third signal which is indicative of the weight of a load which is connected to said load bearing cable;

means for receiving said signals and for determining a maximum load lifting capacity based on said first and second indicative signals; and

means for determining if the weight of said load corresponding to said third signal is greater than a predetermined percentage of said maximum load lifting capacity.

5,160,056

SAFETY DEVICE FOR CRANE

Hideaki Yoshimatsu, Akashi; Norihiko Hayashi, Kakogawa, and Hideki Kinugawa, Himeji, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Sep. 27, 1990, Ser. No. 588,929
Claims priority, application Japan, Sep. 27, 1989, 1-251250; Mar. 26, 1990, 2-77258
Int. Cl.[5] B66C *13/16, 13/18, 23/88*
U.S. Cl. 212—155 **4 Claims**

1. A safety device for a crane which includes a boom mounted for swinging movement and a plurality of ground engaging support members mounted for projecting movement

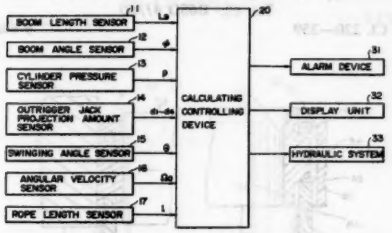
and wherein a suspended cargo is suspended at a predetermined position of said boom, said safety device comprising:

working radius detecting means for detecting a working radius of said boom,

swinging angle detecting means for detecting a swinging angle of said boom,

support member detecting means for detecting projection amounts of said support members,

limit working region setting means sensitive to said support member detecting means for setting a limit working region of said boom in accordance with a weight of the suspended cargo and projection amounts of each of said support members,



remaining angle calculating means for calculating a remaining angle over which said boom can be swung until the set limit working region is exceeded,

braking angular acceleration calculating means for calculating a braking angular acceleration at which swinging movement of said boom is braked and stopped without leaving a shake of the suspended cargo,

required angle calculating means for calculating a required swinging angle of said boom required to brake and stop the swinging movement of said boom at the braking angular acceleration,

comparing means for comparing the thus calculated required angle and the remaining angle, and

operating means for performing a safety operation before the remaining angle exceeds the required angle.

5,160,057

CONTAINER FOR COSMETICS, IN PARTICULAR MASCARA UNIT

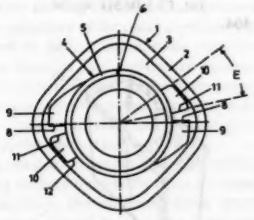
Holger Fitjer, Ansbach, Fed. Rep. of Germany, assignor to Georg Karl Geka-Brush GmbH, Bechhofen-Waizendorf, Fed. Rep. of Germany

Filed Dec. 13, 1990, Ser. No. 627,131

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1989, 3942000

Int. Cl.[5] A45D *34/00*; B65D *41/04*

U.S. Cl. 215—1 C **7 Claims**



1. A container for cosmetics, in particular a mascara unit, comprising a base element of plastic with a front shoulder extending approximately parallel to the container bottom and a threaded neck axially extending away from it, on which a screw closure cap can be threaded wherein, for the purpose of obtaining a defined final catch position of the screw closure cap, at least one stop shoulder and one return stop in the shape of a catch projection, disposed at a distance from the stop shoulder and extending over an extent E of the angle of circumference along the front shoulder, is provided in the bottom area of the threaded neck at the front shoulder, wherein a catch recess, for a catch and stop projection, said catch and stop projection having a shape and dimension at a lower end corresponding to said catch recess and in the locked state is engaged between the stop shoulder and the return stop and protrudes beyond the lower edge of the screw closure cap (**14**), is provided between this stop shoulder and the return stop, and wherein the thread pitch and the start of the thread of the threaded neck and the screw closure cap relative to each other are of such dimensions and are placed such that the catch and stop projection of the screw closure cap in its final catch position comes to rest with its lower end at a base of the stop shoulder of the container shoulder, wherein the top (**24**) of the return stop (**10**) is plane and oriented transversely in relation to longitudinal axis (**25**) of the container and

the extent E of the angle at circumference of the return stop (**10**) in relation to the position of the start of the thread (**6**) to the thread pitch (α) on the one hand, and to the position of the stop shoulder (**8**) at the container shoulder (**3**) on the other hand are chosen in such a way that in the course of closing the catch and stop projection of the screw closure cap (**14**) contacts the top (**24**) of the return stop (**10**) and from there arrives in said final catch position in the course of essentially steady downward movement.

5,160,058

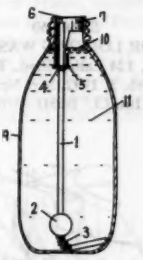
BEVERAGE BOTTLE WITH FLOATING STRAW

Si Y. Ahn, 221-06 58th Ave., Bayside, N.Y. 11364, assignor to Si Y. Ahn, Bayside, N.Y.

Filed Jun. 20, 1991, Ser. No. 717,990

Int. Cl.[5] A47G *19/22, 21/18*; B65D *83/00*

U.S. Cl. 215—1 A **5 Claims**



1. In combination, a beverage bottle with a neck and containing:

(a) a straw having a flexible portion,

(b) a float made of a material of a lesser specific gravity than water and means securing the float about the straw so that the upper portion of the straw will be raised above the bottle neck when the bottle is opened;

(c) a washer that is made of a material that dissolves slowly when in contact with water, the washer being dimensioned to be received about an upper portion of the straw;

(d) a ring defining a circular transversal projection fixed around the straw and dimensioned and disposed below the washer to prevent the washer from moving down said straw; and

(e) a straw guide means including a C-shaped clamp, said straw guide means dimensioned to be secured internally in said bottle neck and said C-shaped clamp being of a dimension smaller than the washer and larger than said ring and being disposed about the straw above the washer so as

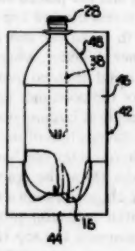
to hold the straw within the bottle while the bottle is being filled.

5,160,059

REINFORCED CONTAINER BASE AND METHOD OF FORMING SAME

Wayne N. Collette, Merrimack; Bryan H. Miller; Suppayan M. Krishnakumar, both of Nashua, and Thomas E. Nahill, Amherst, all of N.H., assignors to Continental PET Technologies, Inc., Florence, Ky.

Filed Apr. 2, 1987, Ser. No. 33,356
Int. Cl.[5] B65D *23/00*; B29C *45/03, 49/06*
U.S. Cl. 215—1 C **8 Claims**



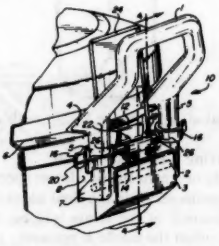
1. A base of a hollow member, said base being of a blow molded plastic material construction and comprising a generally hemispherical upwardly opening configuration interrupted by a series of radially extending circumferentially spaced hollow legs, each of said legs having a lowermost foot sloping axially upwardly and radially inwardly and joined to a central portion of said generally hemispherical configuration by a downwardly opening radius, said hollow member base being improved by a localized thickening of said base, said thickening of said base being substantially restricted to a band-like area of said base including each radius.

5,160,060

APPARATUS FOR LOCKING WASTE CONTAINERS

Robert Garofalo, Jr., 124 Lalley Blvd., Fairfield, Conn. 06430

Filed Feb. 3, 1992, Ser. No. 829,909
Int. Cl.[5] B65D *45/00*
U.S. Cl. 220—318 **16 Claims**



1. An apparatus for securing a cover on a container, comprising:

at least one handle member pivotally mounted on the container for movement into a closed position for holding the cover on the container and movement into an open position for permitting removal of the cover from the container, the handle member including a first leg portion and a second leg portion spaced apart from the first leg portion; and

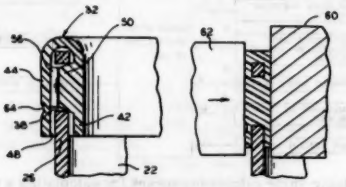
a locking member coupled between the first and second leg portions of the at least one handle member for movement into a first position for securing the handle member in the closed position and for movement into a second position for permitting movement of the handle member into the open position, wherein the container defines a recess for receiving the locking member in the first position, and an entrance to the recess is shaped to engage the locking member by friction to facilitate retaining the locking member in the first position within the recess.

5,160,061

PLASTIC AND FIBER CONTAINER

Michael D. Stolzman, 1188 Old Colony Rd., Lake Forest, Ill. 60045

Continuation-in-part of Ser. No. 773,703, Oct. 9, 1991. This application Apr. 3, 1992, Ser. No. 863,101
Int. Cl.[5] B65D *41/00*
U.S. Cl. 220—359 **9 Claims**



1. A container comprising:

a cylindrical sidewall defining a peripherally enclosed space, said sidewall having an annular end portion defining an open end of said space, said end portion being provided with through openings spaced circumferentially about said open end;

a closure member of synthetic resin comprising a U-shaped annular connecting portion having opposed, facing walls and a turned connecting wall extending therebetween, said connecting portion receiving said outer sidewall end portion between said walls, one of said walls including a plurality of blocks of synthetic resin integrally formed therewith and spaced cicumferentially about the one wall facing the other wall and of a size and shape corresponding to a size and shape of the sidewall through openings to be received therein; and

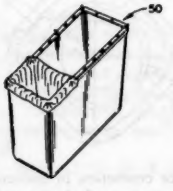
means for securing said connecting ring to said sidewall by vibrationally welding said other wall to said blocks.

5,160,062

BAG SUPPORT FOR RECEPTACLES

Glenn G. Strawder, 9200 Edwards Way #1116, Adelphi, Md. 20783

Continuation-in-part of Ser. No. 468,157, Jan. 22, 1990, Pat. No. 5,085,342, which is a continuation-in-part of Ser. No. 307,912, Feb. 9, 1989, Pat. No. 4,905,853. This application Oct. 23, 1991, Ser. No. 780,995
Int. Cl.[5] B65D *90/04*
U.S. Cl. 220—404 **14 Claims**



1. A receptacle having an upper end,

said upper end comprising means defining at least one cavity for enabling a multiplicity of projections to be selectively

placed in any of a multiplicity of positions at said upper end, said at least one cavity having a substantially closed base, said means, receiving at least two of said projections, for supporting bags in said receptacle,

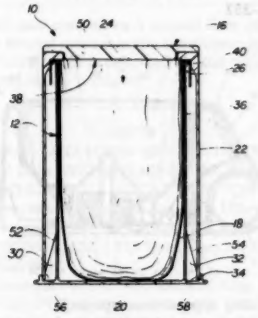
each of said projections, that are included in said means for supporting bags, having a base that mates with said at least one cavity to thereby support the projection.

5,160,063

REFUSE RECEPTACLE

Daryl K. Bailey, 398 Wilson Street, Saint John, New Brunswick, Canada E2M 3T9

Filed Jan. 7, 1991, Ser. No. 637,812
Int. Cl.[5] B65D *25/14*
U.S. Cl. 220—404 **9 Claims**



1. A refuse receptacle adapted to hold a refuse bag in an open state, comprising:

an inner container comprising an interior, a closed bottom, a generally cylindrical sidewall, a generally annular structure attached to an upper portion of the sidewall, and a top with a central opening accessing the interior, the inner container being configured to receive the bag through the central opening into its interior with an upper portion of the bag located over the annular structure, the annular structure being sufficiently resilient that the annular structure deflects elastically from a first orientation downwardly and radially to a second orientation; and,

an outer container surrounding the inner container, the outer container comprising an open bottom, a generally cylindrical sidewall, a top with a central opening, and a generally annular structure internal to the outer container and attached to at least one of the top and the sidewall of the outer container, the outer container being shaped and dimensioned to releasably receive the inner container through the open bottom of the outer container such that the central openings register and permit refuse to be deposited into the bag through the registered openings;

the annular structure of the outer container being shaped and positioned to deflect the annular structure of the inner container from its first position to its second position as the outer container receives the inner container thereby to grip between them the upper bag portion located over the annular structure of the inner container and to maintain the bag in the open state;

the inner container comprising a circumferential structure extending radially outwardly from a bottom portion of the inner container, the circumferential structure having a lower surface shaped to seat on a horizontal support surface and an upper surface shaped to seat the bottom of the outer container, the inner and outer containers are dimensioned such that the annular structures grip the upper bag portion when the bottom of the outer container seats on the upper surface of the circumferential structure.

5,160,064

FUEL CONTAINMENT COVER ASSEMBLY

Leo J. LeBlanc, Bloomfield Hills, Mich., assignor to ERW, Inc., Muskegon, Mich.

Filed May 21, 1991, Ser. No. 703,503
Int. Cl.[5] B65D *45/00*
U.S. Cl. 220—644 **19 Claims**

1. A cover assembly for an upper perimeter of a fuel containment device, said cover assembly comprising:

a skirt having a plurality of notches spaced about an outer perimeter; and

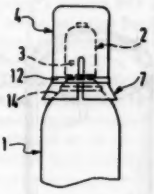
a plurality of inserts having profiles corresponding to said notches for seating within said notches, wherein said skirt and said inserts are molded into a single integrated unit.

5,160,065

PROTECTIVE STRUCTURE FOR A SHUT-OFF VALVE OF A TOXIC GAS CONTAINER

Jean-Louis Libes, Villepreux, and Georges Laureau, Champigny-sur-Marne, both of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Continuation of Ser. No. 654,756, Feb. 13, 1991. This application Mar. 10, 1992, Ser. No. 849,275
Claims priority, application France, May 9, 1990, 90 05778
Int. Cl.[5] B65D *25/00*
U.S. Cl. 220—724 **9 Claims**



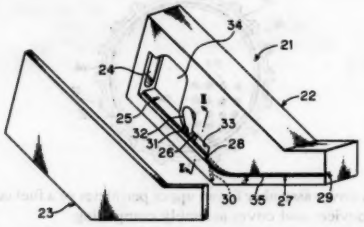
1. A protective structure for a valve of a transportable gas container of the type comprising a metallic hood releasably mounted on the container so as to enclose the valve, further comprising a cover formed of resilient plastic material having an inner recess which opens outwardly through an annular end portion of the cover, the inner recess having a surface configuration substantially matching the outer shape of the hood, and tightening means mounted on the cover for securably mounting the cover on the hood such that the hood is received in the inner recess of said plastic material and is in abutting contact with the surface of said inner recess and said cover is in pressure contact with said gas container.

5,160,066

APPARATUS FOR ALIGNING ELECTRONIC COMPONENT CHIPS

Mitsuro Hamuro, and Toru Konishi, both of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Apr. 4, 1991, Ser. No. 680,566
Int. Cl.[5] B65H *9/14*
U.S. Cl. 221—172 **5 Claims**



1. An apparatus for aligning electronic component chips, which is made substantially completely of a resin material, comprising:

a wall surface defining a chamber for storing a plurality of electronic component chips in random orientations; and

a wall surface defining an aligning passage communicating with said chamber for guiding said electronic components, which were stored in said chamber, to move while aligned along a prescribed direction, after leaving said chamber;

at least said wall surface defining said chamber and said wall surface defining said aligning passage having means for providing said resin material wall surfaces with conductivity.

5,160,067

CONTAINER AND LID APPARATUS

Gary A. Luber, 8611 Goldenwood Rd., Baltimore, Md. 21237

Filed May 28, 1991, Ser. No. 705,949
Int. Cl.[5] B67D *1/16*
U.S. Cl. 222—109 **5 Claims**

1. A container and lid apparatus, comprising in combination,

a container, the container is of a cylindrical configuration and including a container cylindrical side wall, with the side wall including an upper outer annular edge, and an upper inner annular edge spaced from and concentric with the outer annular edge, with a torroidal trough defined between the outer annular edge and the inner annular edge, and the torroidal trough including a plurality of apertures directed therethrough, and

an interior annular wiping edge is formed as a part of a single web with the inner annular edge and the outer annular edge, with the interior annular wiping edge coplanar with the inner annular edge and outer annular edge, and

a concave pouring spout trough originating at the interior annular edge and extending over the torroidal trough and terminating contiguous to the outer annular edge, with the pouring spout trough inclined downwardly from the outer annular edge to the inner annular edge, and

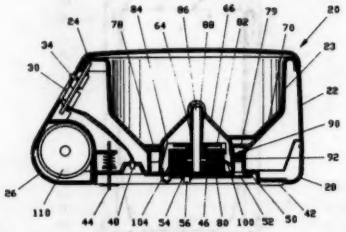
a lid member securable over the outer annular edge and the inner annular edge.

5,160,068

AUTOMATIC DISPENSING FEEDER HAVING A LINEAR ACTIVATOR AND A FELXIBLE SKIMMER

Udi Fishman, and Harry Park, both of San Jose, Calif., assignors to Aedi, Inc., Santa Clara, Calif.

Filed Oct. 11, 1989, Ser. No. 420,102
Int. Cl.[5] G01F *11/10*
U.S. Cl. 222—352 **20 Claims**



1. A dispensing apparatus comprising:

a housing defining an internal cavity for storing material to be dispensed;

a dispensing port defined by said housing;

means for dispensing a measured amount of material through said dispensing port,

said dispensing means including a paddle wheel assembly having a hub element, a plurality of spaced apart flexible paddles radially extending from an outer circumference of said hub element and defining a plurality of compartments of preselected compartment size;

means for rotating said paddle wheel assembly past said dispensing port;

skimmer means for removing excess material from said compartment before dispensing said measured amount of material through said dispensing port; wherein each said measured amount of material is volumetrically defined by said compartment size, said housing, and said skimmer means; and

means for activating said paddle wheel rotating means, said activating means including linear actuator means for converting a linear motion to a rotational motion.

5,160,069

INTEGRATED POWER UNIT COMBUSTION APPARATUS AND METHOD

Reinhard M. Klaass, Phoenix; Bert J. Minshall, Scottsdale; Francis J. Suriano, Scottsdale, and William Caan, Scottsdale, all of Ariz., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

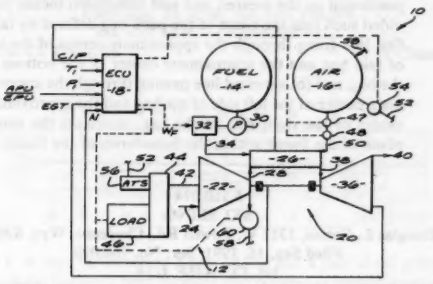
Division of Ser. No. 411,334, Sep. 21, 1989. This application Aug. 26, 1991, Ser. No. 750,176
Int. Cl.[5] F02C *7/26*
U.S. Cl. 60—39.06 **3 Claims**

1. A method of operating a combustor for a turbine engine, said method comprising the steps of:

receiving into said combustor a first flow of pressurized air from a first source;

mixing fuel with said first flow of pressurized air to provide an air/fuel mixture; combusting said air/fuel mixture to

provide a flow of pressurized high temperature combustion products; and



receiving into said combustor a second flow of pressurized air from a second source; while simultaneously discontinuing said first flow of pressurized air and maintaining said flow of combustion products.

5,160,070

REVERSE BULGED FORWARD ACTING SCORED RUPTURE DISC BULKHEAD STRUCTURE FOR MULTI-STAGE ROCKET MOTOR

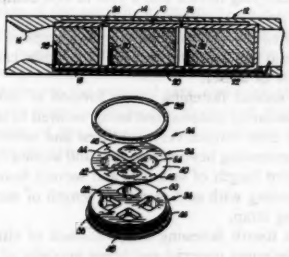
Donald R. Hibler, Bates City, and James O. Hinrichs, Odessa, both of Mo., assignors to Fike Corporation, Blue Springs, Mo.

PCT No. PCT/US89/03425, § 371 Date Mar. 25, 1991, § 102(e) Date Mar. 25, 1991

Continuation-in-part of Ser. No. 231,204, Aug. 11, 1988, abandoned. This PCT application Aug. 11, 1988, Ser. No. 651,338

Int. Cl.[5] F02K *9/28*

U.S. Cl. 60—250 **13 Claims**



1. Rupture disc bulkhead structure for use in a multi-stage rocket motor having a casing provided with a gaseous products discharge port and a plurality of propellant stages adapted to be ignited in successive order commencing with the stage in closest proximity to the discharge port, said bulkhead structure comprising:

an essentially flat, non-apertured rupture disc presenting first and second disc faces and being adapted to be mounted in said casing between each adjacent pair of the propellant stages in full separating relationship thereto; and

a multiple apertured backup member in flat engagement with the face of each disc opposed to the second face of the disc which is in direct contact with an adjacent propellant charge that has last been ignited, the backup member including a plurality of arm segments which at least partially define the apertures in the member,

each of the discs being provided with a plurality of radially extending lines of weakness in the second face of a depth sufficient to cause rupture of that disc at a preselected pressure in a direction away from the backup member which is in supporting engagement with the disc, each line of weakness being aligned with one of the arm segments of the backup member such that the disc is able to withstand pressure thereagainst without rupture during ignition and burning of the last propellant stage to be ignited but to then rupture at a much lower pressure upon ignition of the propellant proximal to a corresponding backup member to allow free flow of gaseous propellant combustion products along a flow path extending through the bulkhead during burning of the latter propellant stage,

each of the lines of weakness including a radially outer termination point, the discs being further provided with a groove formed in the second face and intersecting each termination point such that when the disc ruptures the disc is permitted to move substantially completely out of the flow path of the propellant combustion products by bending along the grooves.

5,160,071

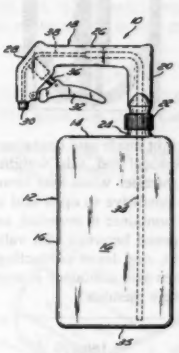
VERTICAL SPRAY BOTTLE NOZZLE

Keith D. Wright, 24071 Pinehurst, Laguna Niguel, Calif. 92677

Filed Oct. 15, 1991, Ser. No. 778,387

Int. Cl.[5] B67D *5/40*

U.S. Cl. 222—383 **12 Claims**



1. A liquid dispensing device for the downward application of a spray, comprising:

a liquid storage bottle defining a top surface and at least one side surface; and

a spray applicator fluidly connected to said bottle, said spray applicator comprising a generally L-shaped housing defining:

a first portion having a bottom end attached to said top surface of said bottle, said first portion extending vertically upward from said top surface of said bottle when attached thereto; and

an elongate second portion extending laterally from said first portion and terminating at a head portion having an outlet nozzle and trigger attached thereto, said outlet nozzle being oriented so as to direct the spray in a downward direction upon actuation of said trigger.

5,160,072

CONTAINER VALVE HAVING A WEIGHTED ACTUATOR

Norman H. Nye, 1348 High Bridge Rd., Cuyahoga Falls, Ohio 44223

Filed Aug. 2, 1991, Ser. No. 739,827

Int. Cl.[5] B67D *5/64*

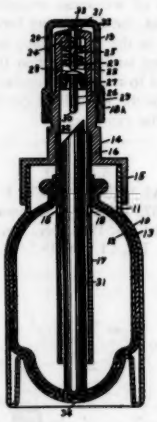
U.S. Cl. 222—463 **5 Claims**

1. A valve for a pressurized fluid dispensing container, said valve comprising:

(a) a valve body having a discharge nozzle portion, said nozzle portion including a valve seat and a valve closure member therefor, said valve closure member opening by

outward axial movement, and means for biasing said valve closure member to closed position, so that said valve closure member is normally held tightly against the valve seat to prevent leakage or discharge of the contents of said container;

(b) a valve stem attached to said valve closure member and extending axially inwardly therefrom;



(c) a shiftable weight inside said container, said weight being an axially reciprocal rod, said weight not affecting said valve closure member when said container is upright or horizontal but operative to open said valve closure member when said container is inverted; and

(d) a lever interposed between said valve closure member and said weight, said lever contacting said rod and said valve stem when said container is inverted so as to open said valve closure member.

5,160,073

PACKFRAME WITH DIAGONALLY SUSPENDED PACK

James Bateman, Box 809, Jackson, Wyo. 83001

Filed Apr. 16, 1991, Ser. No. 686,243

Int. Cl.[5] A45F *3/08*

U.S. Cl. 224—210 **5 Claims**

1. A backpack comprising:

a pack bag having shoulder straps attached to an upper portion of the pack bag forming a first point of attachment, a top, bottom, front, back, left and right sides;

a substantially rectangular frame formed in a single plane for supporting said pack bag;

said frame comprising at least two substantially vertical parallel members wherein said members define the single plane and boundaries so that when the backpack is carried by the shoulder straps being placed over the shoulders of the wearer, said single plane of the frame is substantially parallel to the body of the wearer;

suspension means for suspending said pack bag from the frame with point of attachments of said suspension means on the pack bag and the frame being at a height higher than said first point of attachment with the backpack positioned on the wearer; and said suspension means provided such that the plane of the pack bag defined by (a) a first line going through the approximate center of the top of said bag and the approximate center of the bottom of the bag, and (b) a second line passing through the approximate center of the left side of the bag and the approximate center of the right side of the bag, intersects the single plane of the frame within the boundaries of the frame.

5,160,074

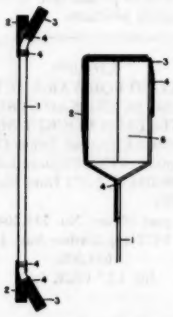
SKI SLING

Douglas L. Coates, 1311 W. Powell Rd., Cheyenne, Wyo. 82009

Filed Sep. 16, 1991, Ser. No. 760,090

Int. Cl.[5] A45F *3/14*

U.S. Cl. 224—257 **2 Claims**



1. A ski carrying device and a pair of skis comprising:

a pair of skis;

an elongated carrying strap having an elongated length with a first end and a second end and sized to be carried over a shoulder of a user;

first and second fastening straps formed of either loop or hook fastening material and being secured to said first and second ends respectively; said first and second fastening straps extending beyond said first and second ends with an elongated length of said first and second fastening straps coextending with said elongated length of said elongated carrying strap;

third and fourth fastening straps formed of either loop or hook fastening material and being opposite of that of said first and second fastening straps; said third and fourth fastening straps secured near the first and second ends of said elongated carrying strap respectively at points spaced away from the securement points of said first and second fastening straps and said elongated carrying strap; said third and fourth fastening straps having an elongated length with one end secured to the elongated carrying strap and being parallel with said elongated length of said elongated carrying strap; said third and fourth fastening straps extending in the same direction as said first and second fastening straps to form a Y-shape at the first and second ends of the elongated carrying strap;

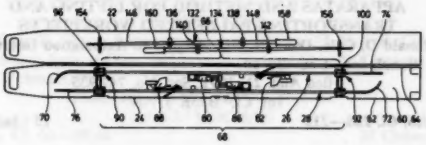
said skis having bottoms positioned next to each other and said skis positioned inbetween the first and third fastening straps at one end and the second and fourth fastening straps at the other end; said first and second fastening straps extending around said skis with said third and fourth fastening straps extending around said skis in the opposite direction to overlap each other; and said first and third straps and said second and fourth straps being secured together by the loop and hook fastening material.

5,160,075

SKICASE AND COOPERATING HOLDERS

Jerry Moscovitch, Ontario, Canada, assignor to EDI Industries Ltd., Tornoto, Canada

Filed Aug. 20, 1990, Ser. No. 570,208
Int. Cl.[5] A63C *11/00;* B60R *9/12*
U.S. Cl. 224—328 15 Claims



1. A case for retaining a pair of skis and a pair of ski poles, each ski having a bent forward end portion, a central portion having a binding comprising toe and heel pieces for receipt of a ski boot, and a relatively straight rear end portion, each of the ski poles having one end portion bearing a basket and an opposing end portion bearing a handle, the case comprising:

a pair of elongate rigid case portions shaped to define an elongate compartment dimensioned to contain the skis;

means for joining the case portions and permitting relative displacement of the case portions between open and closed orientations;

means for releasably securing the case portions in their closed orientation;

means attached to the case for releasably retaining the skis within the compartment in substantially parallel relationship and oriented in opposite directions with the forward bent end portions of the skis in transversely overlapping relationship;

means attached to the case for releasably retaining the poles within the compartment in planes in side-by-side spaced-apart relationship between the inserted skis with lengthwise axes of the poles in substantially an X configuration crossing over proximate to the bindings of the skis when viewed perpendicular to the planes with the basket-bearing end portion of each pole directed inwardly into the space between the retained skis, and with the handle of each pole inset longitudinally from both the handle and the basket of the other pole and proximate to the space between the skis.

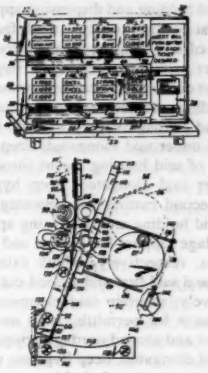
5,160,076

TICKET DISPENSING DEVICE AND METHOD

Ronald K. Ford, San Diego, Calif., assignor to Donald Sutherland, San Diego, Calif., Trustee of the Ralph L. Evans Trust

Filed Mar. 13, 1990, Ser. No. 492,650
Int. Cl.[5] B26F *3/02*
U.S. Cl. 225—4 22 Claims

14. A method of dispensing tickets from a group of relatively stiff tickets fastened together along lines of weakness, said method comprising the steps of storing said tickets in a housing, frictionally driving said tickets towards an outlet opening in said housing, and bending said group of tickets along one of said lines of weakness, issuing at least one ticket from said group through said outlet opening to a position in which it can be grasped by a person outside said housing, with said one ticket bent at a substantial angle so as to encompass a barrier member extending along said one line of weakness, thus presenting said ticket in a position to be pulled, while maintaining



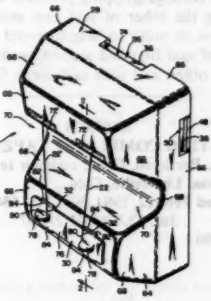
the bend at said one line, to facilitate tearing of said one ticket loose from the rest of the tickets in said group.

5,160,077

STERILE CORDAGE DISPENSER

Scott J. Sticklin, 7650 Birch Bay Drive, Cedar 4, Blaine, Wash. 98230

Filed Dec. 12, 1990, Ser. No. 626,627
Int. Cl.[5] B65H *35/06*
U.S. Cl. 225—38 5 Claims



1. A holding and dispensing apparatus for holding and dispensing cordage from at least a first and a second cordage supply; wherein said holding and dispensing apparatus comprises: a base means; a cover means secured to said base means; an aperture means for providing at least one aperture in said cover means; a first and a second cutting and retaining means for selectively cutting and retaining said cordage from said first and second cordage supplies, respectively, during use of said holding and dispensing apparatus; and a mounting means secured to said base means for mounting said base means to a support surface; wherein said base means and said cover means are for forming a housing means for housing said first and second cordage supplies; wherein said housing means comprises a first and a second compartment means; wherein said first and second compartment means are for receiving said first and second cordage supplies, respectively, during use of said holding and dispensing apparatus; wherein said first and second compartment means are spaced apart from each other; wherein said cover means is also for forming an elongated, deep hygienic depression means; wherein said elongated, deep hygienic depression means is located between said first and

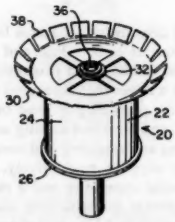
second compartment means; wherein said aperture means comprises a part of said first compartment means; wherein said first and second cutting and retaining means are secured to an outer surface of said second compartment means; wherein, during use of said holding and dispensing apparatus, said cordage from said first cordage supply extends from said first cordage supply, out of said housing means through said aperture means, and over said elongated, deep hygienic depression means to said first cutting and retaining means; wherein, during use of said holding and dispensing apparatus, said cordage from said second cordage supply extends from said second cordage supply, under said elongated, deep hygienic depression means, out of said housing means through said aperture means, and over said elongated, deep hygienic depression means to said second cutting and retaining means; wherein, during use of said holding and dispensing apparatus, said first and second cordage supplies have a first and a second cordage gripping portion, respectively, which extend between said aperture means and said first and second cutting and retaining means, respectively; wherein said elongated, deep hygienic depression means is for permitting said user to easily grasp either of said first and second cordage gripping portions without touching said elongated, deep hygienic depression means, in order to help to avoid undesirable cross contamination of said first and second cordage gripping portions with said elongated, deep hygienic depression means, and with said user's fingers; wherein, during use of said holding and dispensing apparatus, said holding and dispensing apparatus is mounted to said support surface with said aperture means located above said first and second cutting and retaining means, and with said first and second cordage gripping portions oriented at least substantially vertically; and wherein said aperture means and said cutting and retaining means are also for widely separating said first and second cordage gripping portions a distance sufficient to enable a user's fingers to easily grasp one of said first and second cordage gripping portions without said user's fingers touching the other of said first and second cordage gripping portions, in order to help to avoid undesirable cross contamination of said first and second cordage gripping portions with each other, and with said user's fingers.

5,160,078

ROTATING COMPLIANT TAPE GUIDE

Barry K. Spicer, Berthoud, Colo., assignor to Storage Technology Corporation, Louisville, Colo.

Filed Feb. 12, 1991, Ser. No. 654,222
Int. Cl.[5] B65H *27/00*
U.S. Cl. 226—190 **14 Claims**



1. A tape guide for positioning tape within a tape drive system, said tape guide comprising:

an elongated roller mounted to rotate within said tape drive system, said roller having a first end and an opposing second end;

a tape contacting portion formed on said roller between said first end and said second end, said tape contacting portion having a width less than the width of the tape being guided by said tape guide;

a flange on said roller adjacent the second end of said roller, said flange having a diameter larger than the diameter of said tape contacting portion; and

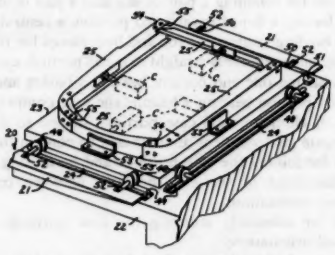
compliant means affixed to said first end of said roller to rotate with said roller for providing a uniform resilient force against one edge of the tape to bias the other edge of the tape against said flange.

5,160,079

APPARATAS AND METHOD FOR LIFTING AND TRANSPORTING PALLETIZED WORKPIECES

Ronald D. Cole, Danville, Ill., assignor to Automation International, Inc., Danville, Ill.

Filed Aug. 21, 1991, Ser. No. 747,935
Int. Cl.[5] B23K *37/04*
U.S. Cl. 228—212 **15 Claims**



1. A transporter for conveying a pallet having multiple unconnected workpieces located in predetermined positions in relation to a registering means on said pallet between successive work stations at which the workpieces are fabricated by programmable welders into a unitary structure,

a rotary carousel including a turret mounted for rotation on a fixed vertical axis,

a plurality of pallet-transporting arms extending essentially horizontally and radially from said turret, said arms being equally angularly spaced and of the same length, and each arm having at its extended end a radially directed pallet-supporting fork having a pair of horizontally-spaced tines,

a plurality of work tables extending peripherally around the carousel at a radial distance from said vertical axis corresponding to the length of said arms and said tables being spaced the same horizontal angular distance as said arms, whereby pallets supported on said forks can be carried thereby to said work tables and deposited thereon to enable welding of the workpieces,

first motive means for imparting rotary motion to said turret to move said arms in a horizontal plane to convey pallets in succession from table to table,

second motive means for imparting vertical motion to said turret for lowering and depositing pallets onto the tables or lifting them therefrom,

clamp means on said pallets for affixing pieces to be fabricated thereto,

registering means including upwardly-facing like first fine locating and registering members on each of said tables and cooperating downwardly-facing fine locating and registering members adjacent the undersides of each of said pallets, and upwardly-facing coarse third registering members on each of said fork tines and cooperating downwardly-facing coarse fourth registering members on each of said pallets,

programmable automatic welding apparatus mounted in a predetermined relation with and adjacent each work table for performing fabrication tasks on workpieces placed on its table when a pallet is deposited on and registered thereto, and,

control means for said first and second motive means, operable in response to completion of the fabrication tasks at all tables, to enable vertical lifting of pallets from each table,

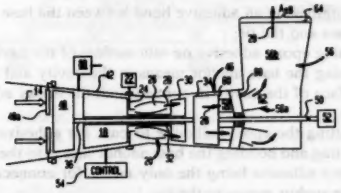
horizontal transporting of pallets to the next-following table and vertical lowering them thereonto, and further enabling work to commence at the next table only upon completion of depositing and locating the pallets on the tables.

5,160,080

GAS TURBINE ENGINE AND METHOD OF OPERATION FOR PROVIDING INCREASED OUTPUT SHAFT HORSEPOWER

William R. Hines, Montgomery, and William M. Farrell, Cincinnati, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Oct. 1, 1990, Ser. No. 590,723
Int. Cl.[5] F02C *6/00*
U.S. Cl. 60—39.04 **26 Claims**



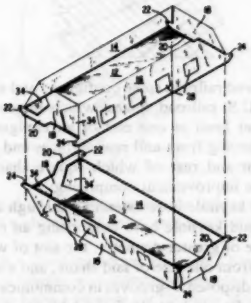
1. A gas turbine engine comprising:
an output shaft;
compression means for compressing air;
combustion means for adding fuel to compressed airflow from said compression means and generating combustion gases;
turbine means for extracting energy from said combustion gases for powering said compression means and said output shaft;
means for obtaining choked flow of said combustion gases channeled through said turbine means for increasing shaft horsepower in said output shaft; and
said compression means being effective for supercharging said turbine means at a predetermined speed of said output shaft for increasing said shaft horsepower while obtaining a decrease in thermal efficiency of said engine below a maximum thermal efficiency thereof.

5,160,081

LOCKING TRAYS

Jonathan T. Beales, Memphis, Tenn., assignor to International Paper Company, Purchase, N.Y.

Filed Dec. 27, 1991, Ser. No. 813,734
Int. Cl.[5] B65D *43/02*
U.S. Cl. 229—114 **12 Claims**



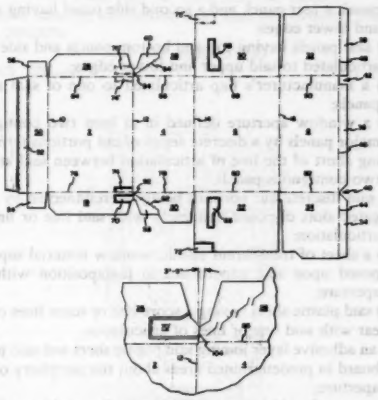
1. A unitary paperboard blank for forming a tray, the blank being cut and scored to yield cut and fold lines which define a plurality of panels, having free edges not connected to any other panel, the blank including a bottom panel, a pair of opposite sidewall panels, a pair of opposite endwall panels, one of said sidewall panels being wider than the other sidewall panel, the widest sidewall panels having a latching tab at each end thereof remote from the fold line joining said widest sidewall panel to said bottom panel, each endwall panel being of a dual width to define a wider and a narrower segment, that end of each wider segment of each said endwall panel having a latching tab remote from the fold line joining a respective endwall panel to said bottom panel, each said endwall latching tab projecting generally away from said wider sidewall panel, each said wider endwall segment being more remote from said wider sidewall panel than its respective narrowest segment.

5,160,082

LEAK PREVENTING BLANK AND CARTON FOR ICE CREAM AND THE LIKE

Robert J. McCormick, Rochester; James C. Zimmerman, North Tonawanda, both of N.Y., and B. Edward Shlesinger, Jr., Alexandria, Va., assignors to Somerville Packaging, Rochester, N.Y.

Filed Feb. 19, 1992, Ser. No. 836,851
Int. Cl.[5] B65D *5/02*
U.S. Cl. 229—134 **39 Claims**



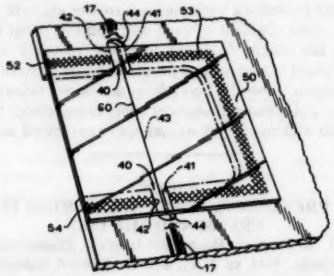
1. A leak preventing carton for ice cream and the like comprising:
a) a rectangular sleeve of uniform thickness having top and bottom and inner walls forming a chamber for receiving ice cream;
b) said bottom and top each having inwardly folded first-in and second-in end flaps;
c) each of said end flaps having first, second and top edges;
d) at least one of said first-in end flaps substantially closing the corresponding one of said top and bottom of said sleeve except for a uniformly wide gap formed between said top edge of said at least one of said first-in end flaps and the corresponding inner wall;
e) said gap extending the length of the top edge of the corresponding one of said first-in end flaps;
f) said gap having first and second portions;
g) at least one of said second-in end flaps including an infolded lip extending into said gap and filling substantially only said first portion; and
said sleeve having a deboss adjacent said second gap portion and extending the length of said second gap portion for preventing leakage through said second gap portion.

5,160,083

WINDOWED FOLDING CARTONS

Loren F. Lafreniere, Matthews, N.C., assignor to Rexham Corporation

Filed Oct. 16, 1991, Ser. No. 778,382
Int. Cl.[5] B65D 5/42
U.S. Cl. 229—162 **4 Claims**



1. A composite blank for a folding carton, said blank comprising:

(a) a sheet a paperboard cut and scored along a series of lines of articulation to define consecutively articulated major panel;

(b) said major panels including a front panel, a first side panel, a rear panel, and a second side panel having upper and lower edges;

(c) said panels having top and bottom panels and side flaps articulated to said upper and lower edges;

(d) a manufacturer's flap articulated to one of said major panels;

(e) a window aperture defined in at least two contiguous major panels by a discrete series of cut portions terminating short of the line of articulation between said at least two contiguous panels;

(f) said discrete cut portions being interconnected by elongated slots disposed colinearly with said line or lines of articulation;

(g) a sheet of transparent plastic window material superimposed upon said paperboard in juxtaposition with said aperture;

(h) said plastic sheet having a score line or score lines collinear with said line or lines of articulation.

(i) an adhesive layer joining said plastic sheet and said paperboard in predetermined areas about the periphery of said aperture;

(j) zones of said blank and said plastic disposed immediately adjacent to said elongated slots being free of adhesive, whereby said major panels may be erected into parallel-piped form with the superimposed plastic window sheet without any wrinkling or delamination of said plastic sheet from said paperboard.

5,160,084

METHOD FOR ADHESIVELY BONDING A RAIL-TIE FASTENING ASSEMBLY TO A WOODEN RAILWAY TIE

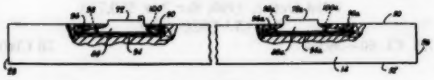
S. Hudson Owen, Marshfield, Wis.; Roger A. Baldwin, Warr Acres, Okla.; Gerald E. Taylor, and Paul A. Wolff, both of Oklahoma City, Okla., assignors to Kerr-McGee Corporation, Oklahoma City, Okla.

Continuation of Ser. No. 414,226, Sep. 29, 1989, abandoned, which is a continuation-in-part of Ser. No. 128,174, Dec. 3, 1987, Pat. No. 4,874,128. This application Jan. 8, 1992, Ser. No. 819,578
Int. Cl.[5] E01B 2/00, 9/00
U.S. Cl. 238—310 **2 Claims**

1. A method for connecting a rail-tie fastening assembly to a surface of a wood tie, wherein the rail-tie fastening assembly comprises a base anchor means and means attached to the base anchor means for connecting said base anchor means to a rail, comprising:

forming a cavity in the tie sized for accommodating the base anchor means;

drying only an outermost surface of the cavity and a portion of the tie immediately inward into the tie under the outermost surface at a temperature above 50° C. for a period of time sufficient to reduce the moisture content in said surface, which is initially greater than 28 percent by weight, to a level below 28 percent by weight for



strengthening an adhesive bond between the base anchor means and the tie;

disposing epoxy adhesive on said surface of the cavity;

disposing the base anchor means in the cavity and on said surface of the cavity in contact with the epoxy adhesive; and

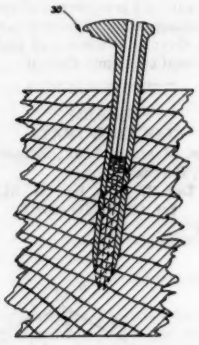
permitting the epoxy adhesive to cure for adhesively connecting and bonding the base anchor means to the tie, the epoxy adhesive being the only means for connecting the base anchor means to the tie.

5,160,085

RAILROAD SPIKE

James W. Arnold, and Evelyn J. Arnold, both of P.O. Box 1150, Biggs, Calif. 95917

Filed Nov. 8, 1991, Ser. No. 793,559
Int. Cl.[5] E01B 9/04
U.S. Cl. 238—366 **9 Claims**



1. An improved railroad spike configured and sized to match conventional U.S. railroad spikes, which improved spike includes an offset head at one end of an elongated generally square shank having front and rear surfaces and two side surfaces, the front and rear of which square shank taper to a pointed tip, the improvement comprising:

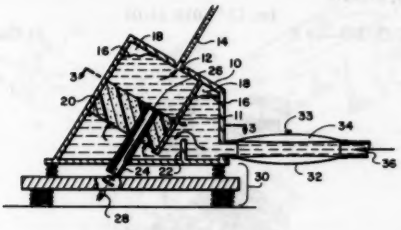
a full length keyhole bore extending through said head and said tip, said keyhole bore comprising an elongated slot and a bore of greater diameter, the slot of which extends inwardly from one side of said shank, and a spaced pair of angularly disposed V-grooves in communication with said bore, and disposed on the front and rear surface of said shank.

5,160,086

LIGHTED LAMINAR FLOW NOZZLE

Robert L. Kuykendal, 3435 Hawthorne, St. Louis, Mo. 63104; David R. Usher, 118 Oakwood, St. Louis, Mo. 63119, and Ronald S. Deichmann, 6040 Circle Dr., House Springs, Mo. 63051

Filed Sep. 4, 1990, Ser. No. 577,491
Int. Cl.[5] F21P 7/00; B05B 1/10
U.S. Cl. 239—18 4 Claims



1. In a laminar-flow fluid nozzle, the combination of a fluid chamber having one substantially knife edged outlet orifice, an inlet port connected to a wall of said fluid chamber, a diffuser means disposed within said chamber between said inlet port and said outlet orifice, said outlet orifice being located on one wall of said fluid chamber such that the distance from said outlet orifice to any adjacent side wall of said fluid chamber is substantially different from the distance to any other adjacent side wall, whereby the non-centered location of said outlet orifice functions to dampen the effect of pump surges and vibration and thereby increases the laminarity of the output stream emanating from said outlet orifice.

2. In a laminar-flow fluid nozzle, the combination of a fluid chamber having a substantially knife edged outlet orifice, an inlet port connected to a wall of said fluid chamber, a diffuser means disposed within said chamber between said inlet port and said outlet orifice, said fluid chamber being mounted on three or more shock absorbing springs whereby said fluid chamber is isolated from vibration in order to increase the laminarity of the output stream emanating from said outlet orifice.

5,160,087

DRINKING STRAW

Gerald D. Mandell, P.O. Box 583, Ashland, Oreg. 97520

Filed Jul. 1, 1991, Ser. No. 724,117
Int. Cl.[5] A47G 21/18
U.S. Cl. 239—33 10 Claims

10. A method for demonstrating the importance of teamwork between a plurality of users, said method comprising the steps of:

a. providing a drinking straw apparatus having a hollow chamber, a tubular inlet member connected to said hollow chamber to form a passage for the flow of liquid into said hollow chamber, and a plurality of tubular outlet mouthpiece members, one for each of the plurality of users, connected to said hollow chamber to form a passage for the flow of liquid from the hollow chamber to each user's mouth;

b. immersing the tubular inlet member into a reservoir of liquid;

c. creating suction simultaneously by all users in their respective tubular outlet mouthpiece members;

d. drawing cooperatively, by continuing simultaneous suction by all users, liquid from said reservoir into said hollow chamber; and

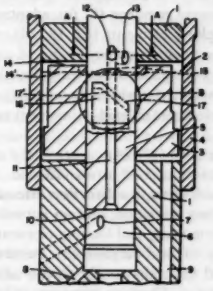
e. continuing to draw, by further continuing simultaneous suction by all users, said liquid from within said hollow chamber through each tubular outlet mouthpiece member and into each user's mouth.

5,160,088

INJECTION PUMP FOR DIESEL ENGINES

Gerhard Weiss, Marchtrenk, and Peter Baumgartner, St. Andrae, both of Austria, assignors to VOEST-ALPINE Automotive Gesellschaft m.b.H., Linz, Austria

PCT No. PCT/AT90/00014, § 371 Date Nov. 26, 1990, § 102(e) Date Nov. 26, 1990, PCT Pub. No. WO90/08892, PCT Pub. Date Aug. 9, 1990
PCT Filed Jan. 30, 1990, Ser. No. 613,659
Claims priority, application Fed. Rep. of Germany, Jan. 30, 1989, 3902670
Int. Cl.[5] F02M 59/20
U.S. Cl. 239—88 11 Claims



1. A fuel injection pump for diesel engines comprising:

at least one pump piston forming a high pressure chamber with a piston bushing, said piston being surrounded by a control sleeve which is rotatably and axially displaceable relative to the piston;

an axial bore provided in said piston, the axial bore communicating with the high pressure chamber;

means for introducing a supply of fluid to said high pressure chamber;

a regular control bore and an auxiliary control bore provided in one of said piston and sleeve, said control and auxiliary control bores being radially oriented relative to the axis of said axial bore;

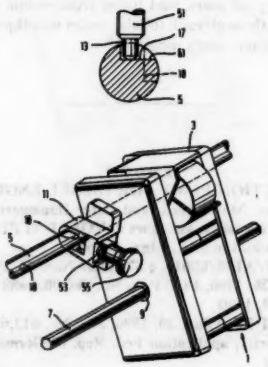
control edges provided on the other of said piston and sleeve for selectively establishing adjustable fluid flow from the high pressure chamber through said axial and control bores over said control edges to a discharge port from said fuel injection pump in response to axial displacement of the control sleeve relative to the piston, said control bores cooperating with said control edges so that fluid flow through the auxiliary control bore is prevented until fluid flow through the regular control bore is established.

5,160,089

SHEET-STAPLING DEVICE

Manfred Radtke, Korb, and Juergen Ries, Nellingen, both of Fed. Rep. of Germany, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 25, 1991, Ser. No. 797,623
Claims priority, application Fed. Rep. of Germany, Jan. 18, 1991, 4101391
Int. Cl.[5] B42B *2/00*
U.S. Cl. 227—111 8 Claims



1. Sheet-stapling device comprising: an elongate adjustment member; at least one stapling head (1) supported on said adjustment member (5) so as to be shiftable in an adjusting direction along said adjustment member (5) for adaptation to different sheet formats; locking elements (17, 18, 13) respectively provided on said adjustment member (5) and on said stapling head (1) to cooperate with each other for releasably locking said stapling head in selected position on said adjustment member (5), said locking elements on said adjustment member (5) being arranged in

more than one row (23, 24) respectively extending in the adjusting direction, said rows (23 and 24) being offset relative to each other in a direction extending transversely to the adjusting direction; and an actuating element (31) for relatively moving said locking elements (17, 18 and 13, respectively) of said adjustment member (5) and said stapling head (1) transversely to the adjusting direction and thus align said locking elements (13) of said stapling head with a desired one row (23 or 24) of said locking element (17, 18) on said adjustment member (5).

5,160,090

METHOD OF MAKING HIGH-STRENGTH BRAZED JOINTS

Christian Friedrich, Pflach; Nikolaus Reheis, Jerzens, and Walter Thalmann, Breitenwang, all of Austria, assignors to Schwarzkopf Technologies Corporation, New York, N.Y.

Filed Sep. 20, 1991, Ser. No. 763,118
Claims priority, application Austria, Sep. 21, 1990, 1918/90
Int. Cl.[5] B23K *1/20*
U.S. Cl. 228—121 12 Claims

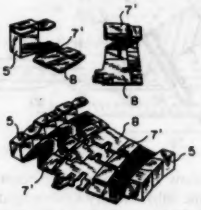
1. A method of making high-strength brazed joints in metal/ceramic and ceramic/ceramic composite materials, said method followed by a brazing operation, wherein said method comprises subjecting a ceramic material surface to be brazed to a structuring operation before said brazing operation in order to obtain an enlarged brazing surface area, said structuring operation effected by forming bores through said ceramic material surface without penetrating through the depth of said ceramic material, said bores having an average diameter in the range of 50 μmm–500 μm and a depth in the range of 100 μm–2 mm.

5,160,091

TOY VEHICLE TRACK

Kurt Hesse, Waldstrasse 36, 8510 Fürth, Fed. Rep. of Germany

Continuation of Ser. No. 264,919, Oct. 27, 1988, abandoned.
This application Sep. 4, 1991, Ser. No. 754,297
Claims priority, application Fed. Rep. of Germany, Oct. 27, 1987, 8714278
Int. Cl.[5] E01B *23/00*
U.S. Cl. 238—10 E 12 Claims



1. A toy vehicle track with at least one toy vehicle, each of said at least one toy vehicle having a chassis in which an electric motor is disposed;

said toy vehicle track comprising a plurality of segments having a first edge, a second edge, a front face, and a back face, interlocking means being disposed on the first edge and the second edge of each of said plurality of segments, so that the front face of each segment may be pivotally engaged to an adjacent segment's back face via said interlocking means and a plurality of segments engaged in a front to back relationship will extend said track in a longitudinal direction;

each of said plurality of segments comprising at least two electrical conductors which are each spring clipped to a section of the segment intermediate the first and second edges and thus between the interlocking means, the electrical conductors having contact tongues for engaging other electrical conductors on another segment of track, so that an uninterrupted path for electrical current is formed between electrical conductors when said segments are engaged in said front to back relationship;

each said at least one toy vehicle being equipped with collectors in contact with said conductors, and a chargeable power source used as an electrical buffer, said power source and said collectors being simultaneously in permanent contact with said drive motor.

5,160,092

SPRAY GUN TRIGGER GUARD APPARATUS

James P. Rose, P.O. Box 188, and Norville W. Phillips, 15435 Ave. C., both of Channelview, Tex. 77530

Filed Jan. 8, 1992, Ser. No. 818,251
Int. Cl.[5] B05B *15/00*
U.S. Cl. 239—288.5 4 Claims

1. A spray gun trigger guard apparatus, comprising,

a spray gun including a spray gun housing, the spray gun housing including a housing handle reservoir extending downwardly and coaxially aligned relative to the housing, with housing including an outlet conduit orthogonally oriented relative to the handle reservoir, and

a trigger plate, the trigger plate including a bifurcated upper distal end, and the upper distal end pivotally mounted to the housing, and

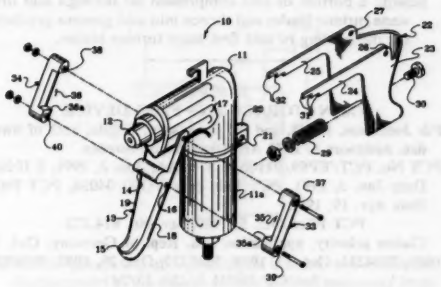
the housing further including a second bore directed through the housing pivotally mounting the bifurcated upper distal end of the trigger plate, and

the trigger plate including a first bore directed through the

trigger plate, wherein the first bore is oriented parallel relative to the second bore, and the trigger plate includes a first end wall spaced from a second end wall, and the first bore is directed through the first end wall and the second end wall, and

a trigger housing boss fixedly mounted to the housing adjacent the handle reservoir, with the housing boss diametrically opposed to the trigger plate and the trigger housing boss including a boss bore directed therethrough, the boss bore oriented parallel to the first bore into the second bore, and

"U" shaped guard means pivotally mounted to the housing for effecting selective abutment of the trigger plate relative to the housing.

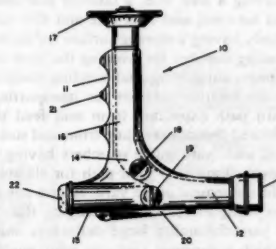


5,160,093

MULTI-MODE WATERING APPARATUS

John J. Battaglia, 5205 Valle Vista NW., Albuquerque, N. Mex. 87120

Filed Apr. 30, 1991, Ser. No. 693,387
Int. Cl.[5] B05B *15/06, 9/03*
U.S. Cl. 239—444 **6 Claims**



1. A watering apparatus for both hand-held and ground use comprising:

casing means comprising contoured hand grip means disposed about first waterway means for directing water flow through said casing means in a first relatively vertical direction through a first spray head means;

second waterway means for directing water flow through said casing means in a second relatively horizontal direction through a second spray head means;

means for controlling flow in said first and second waterway means, wherein said means for controlling flow in said first and second waterway comprises valve means enabling simultaneous or independent flow in both said first and second waterway means; and

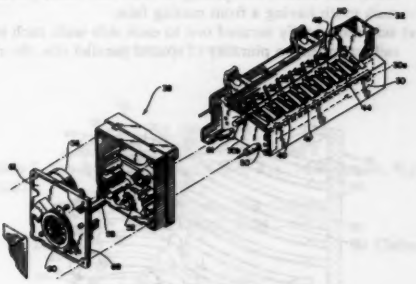
ground engaging means comprising pivotable spike means wherein said watering apparatus is capable of four modes of operation.

5,160,094

RECOVERABLE DOMESTIC ICE MAKER

James L. Willis, Ft. Smith, Ark., and James R. Giordano, Loveland, Ohio, assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Feb. 24, 1992, Ser. No. 840,027
Int. Cl.[5] F25C *5/18*
U.S. Cl. 62—137 **12 Claims**



1. An ice making apparatus comprising:

a mold in which water is frozen to form an ice body;

means for ejecting the ice body from the mold;

an electric motor;

a drive system driven by said motor and operatively driving said ejecting means;

an electric heater in heat transfer association with the mold for freeing the ice body from the mold;

control circuit means including a thermostat, said thermostat being responsive to temperature of the mold, a thermostat switch controlled by said thermostat to initiate a harvest cycle by energizing said motor for ejecting the ice body upon complete freezing thereof and concurrently energizing said heater, and electric circuit means including said thermostat switch, said motor, said heater and a holding switch controlled by operation of said motor for maintaining energization of said motor independently of said thermostat switch and causing the thermostat switch to control further energization of the heater;

a sensor arm for sensing a quantity of ice bodies previously ejected by the ice making apparatus and stored therebelow; and

a linkage mechanism driven by said drive system for controllably positioning said sensing arm in a raised or lowered position, said sensing arm normally being in the lowered position and said linkage mechanism controllably raising said sensing arm and subsequently lowering said sensing arm at select operational positions of said drive system during a harvest cycle of operation to determine if a preselected quantity of ice bodies is stored therebelow, said linkage system coacting with said drive system to operate in a failsafe mode during a harvest cycle to prevent further operation of said motor in response to an obstruction preventing the raising of said sensing arm, and immediately continuing said harvest cycle upon removal of said obstruction.

5,160,095

MACERATORS

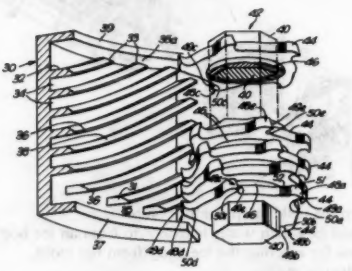
Robert Pepper, Congleton, England, assignor to Mono Pumps Limited, England

Filed Jan. 9, 1992, Ser. No. 819,099
Int. Cl.[5] B02C *23/36*
U.S. Cl. 241—46.06 **10 Claims**

1. A macerator for macerating liquid borne solid material, said macerator comprising, in combination:

a) a macerating chamber;

b) side walls of said chamber;
c) first and second parallel contra-rotating shafts extending through said chamber between said side walls and mounted on parallel axes of rotation;
d) a plurality of alternate disc shaped, generally planar, cutters and spacers of the same axial thickness mounted on each of said first and second shafts, the planar cutters extending in planes perpendicular to said axes, the cutters of the first shaft being interleaved with those of the second shaft, said cutters comprising at least one tooth thereon, each tooth having a front cutting face;
e) side rails rigidly secured one to each side wall, each side rail comprising a plurality of spaced parallel ribs, the ribs



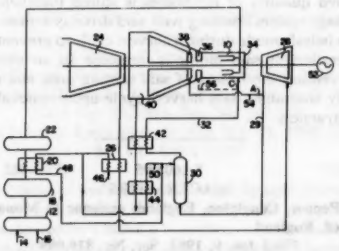
forming therebetween slots, the radially inner edge surfaces of the ribs, with respect to the axes of rotation of the adjacent shaft, being concave, the concave edge faces of the ribs closely conforming to the path of movement of the tips of the cutter teeth, as they rotate past said side rail; and
f) edge faces of said ribs in close proximity to the teeth on the cutters as the teeth pass adjacent thereto, the parallel ribs of each side rail being angled at an acute angle to the planes of the cutters of the adjacent shaft, effective to ensure that liquid borne solid material passing along each of said slots crosses the planes of at least two of said cutter elements.

5,160,096

GAS TURBINE CYCLE

Gary M. Perkins, Palm Beach Gardens; Donald M. Podolsky, Jupiter, and James J. Kana, West Palm Beach, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 11, 1991, Ser. No. 774,908
Int. Cl.[5] F02C *7/16*
U.S. Cl. 60—39.05 **2 Claims**



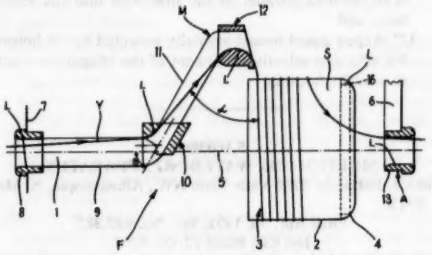
1. A method of operating a humid air gas turbine cycle comprising:
compressing air to a predetermined pressure level to form compressed air;
humidifying said compressed air to form a gaseous medium;
delivering said gaseous medium to a combustor;
burning fuel in said combustor forming high temperature gaseous products;
passing said gaseous products through a gas turbine for the generation of power, said gas turbine including first stage stationary vanes and first stage turbine blades;
passing a portion of said gaseous medium through said first stage stationary vanes and thence into said gaseous products for the cooling of said first stage stationary vanes; and
passing a portion of said compressed air through said first stage turbine blades and thence into said gaseous products for the cooling of said first stage turbine blades.

5,160,097

YARN STORAGE AND FEED DEVICE

Pär Josefsson, Borås, and Alf Bengtsson, Fritsla, both of Sweden, assignors to IRO AB, Ulricehamn, Sweden

PCT No. PCT/EP89/01166, § 371 Date Jun. 3, 1991, § 102(e) Date Jun. 3, 1991, PCT Pub. No. WO90/04058, PCT Pub. Date Apr. 19, 1990
PCT Filed Oct. 5, 1989, Ser. No. 674,372
Claims priority, application Fed. Rep. of Germany, Oct. 7, 1988, 3834231; Oct. 17, 1988, 3835319; Oct. 28, 1988, 3836833
Int. Cl.[5] B65H *51/20, 57/24*
U.S. Cl. 242—47.01 **16 Claims**



1. In a yarn storage and feed device for a textile machine, said device having a feed side, a take-off side and a storage body disposed between said feed side and said take-off side, said storage body having a storage surface for storing a length of yarn, a winding member for winding the yarn on said storage surface, means supporting said winding member and said storage body for relative rotation for transporting the yarn through a yarn path extending from said feed side to said storage surface and thence extending from said storage surface to said take-off side, yarn guide members having yarn guide surfaces disposed along said yarn path for slidable engaging and guiding the movement of the yarn, at least one of said yarn guide surfaces being effective for changing the direction of travel of the yarn through a large deflection angle, the improvement which comprises: said one yarn guide surface is formed of a high-density, sintered molding of hard ceramic material, said molding having been made by isostatic hot pressing in an encapsulation, said one yarn guide surface exhibiting low friction to yarn moving thereacross and being effective to minimize yarn breaks.

5,160,098

TENSION CONTROL SYSTEM AND METHOD

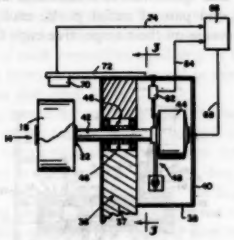
Larry G. Durkos, 95 S., 400 West, Lebanon, Ind. 46052

Filed Nov. 21, 1990, Ser. No. 616,885
Int. Cl.[5] B65H *23/185, 23/198, 77/00*
U.S. Cl. 242—75.510 **26 Claims**

1. A control system for maintaining a substantially constant predetermined tension on material being unwound from or wound onto a roll of material, the system comprising
a frame,
a shaft for holding the roll of material,

a motor coupled to the shaft for rotating the shaft at a predetermined speed to maintain the material at a substantially constant predetermined tension,

means for rotatably coupling the shaft and the motor to the frame to position the motor in an initial preset position relative to the frame, the coupling means permitting limited rotational movement of the motor relative to the frame in response to the tension on the material deviating from the predetermined tension,



means for generating an output signal indicative of rotational displacement of the motor relative to the frame away from to its initial preset position, and

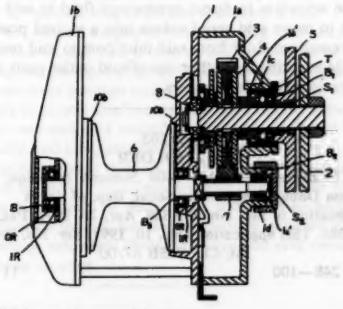
means for adjusting the speed at which the motor rotates the shaft by an amount based upon the output signal to maintain the tension of the material at substantially the predetermined tension, the adjusting means being coupled between the generating means and the motor.

5,160,099

FISHING REEL WITH SHAFT ALIGNMENT CONSTRUCTION

Yoshiyuki Furomoto, Sakai, Japan, assignor to Shimano Industrial Co., Ltd., Osaka, Japan

Filed Feb. 22, 1990, Ser. No. 482,912
Claims priority, application Japan, Feb. 28, 1989, 1-23694[U]
Int. Cl.[5] A01K *89/015*
U.S. Cl. 242—321 **4 Claims**



1. A fishing reel comprising:

a reel body,

a spool rotatably supported to said reel body through a spool shaft,

a handle for rotating a handle shaft,

a drive mechanism for driving said spool shaft upon rotation of said handle shaft, and

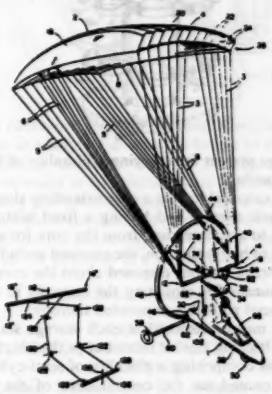
bearing members supported by the reel body for rotatably supporting said handle shaft and spool shaft, at least one of said bearing members including an outer peripheral face and an inner peripheral face eccentric relative to said outer peripheral face to permit position adjustment of the shaft supported by said at least one bearing member upon the rotation of said at least one bearing member relative to said reel body, said reel body including a tubular portion having an inner surface defining a first engaging portion that engages with a second engaging portion provided on said at least one bearing member said first and second engaging portions comprising means for preventing relative rotation between said at least one bearing member and said reel body when said fishing reel is in use, said engaging portions being disengageable to permit said at least one bearing member to be rotated relative to said reel body to permit said position adjustment.

5,160,100

AIRFOIL CANOPY AIRCRAFT

Stephen L. Snyder, 420 Pleasant Valley Ave., Moorestown, N.J. 08057

Filed Jul. 1, 1991, Ser. No. 724,191
Int. Cl.[5] B64C *3/38*
U.S. Cl. 244—13 **21 Claims**



21. An aircraft comprising:

an airfoil canopy for producing lift by aerodynamic forces exerted thereon;

a plurality of flexible load lines connected to said canopy;

a vehicle suspended from said canopy by said load lines in a flight supporting position said vehicle having a center of gravity and a directional axis extending in the direction substantially of flight of said vehicle in said flight supporting position;

steering control bar means movably mounted on said vehicle and extending in a direction substantially transverse to said directional axis;

at least two suspension points on said control bar means connected to said load lines so that said center of gravity of said vehicle is below said suspension points in said flight supporting position;

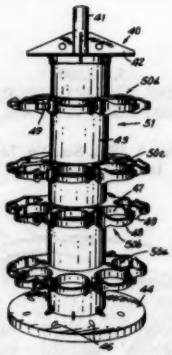
control means for moving said steering control bar means relative to said vehicle for manipulating said load lines to control the attitude of said canopy in said flight supporting position and steer the aircraft;

electric motor means mounted on said vehicle;

propeller means mounted on said vehicle and connected to said motor means for being driven thereby to provide thrust for the aircraft; and

battery means supported on the vehicle below said control bar means and operatively connected to said motor means for operating said motor means.

5,160,101
BUOY DEPLOYMENT SYSTEM
John R. Ferraro, Clinton; Philip P. Foerster, Waterbury; Peter T. Greenstreet, Sandy Hook, all of Conn.; Steven R. Schwarz, Cranbury, N.J., and Milton R. Turgeon, Enfield, Conn., assignors to United Technologies, Corp., Hartford, Conn.
Continuation of Ser. No. 495,283, Mar. 16, 1990, abandoned, which is a division of Ser. No. 250,783, Sep. 28, 1988, Pat. No. 4,962,798. This application Jun. 5, 1991, Ser. No. 711,362
Int. Cl.[5] B64D *9/00*
U.S. Cl. 244—118.1 7 Claims



1. A storage system for carrying a plurality of buoys on an aircraft comprising:

a rotatable carousel having a core extending along the longitudinal axis thereof and having a fixed bottom platform attached to and extending from the core for supporting a plurality of buoys thereon, the carousel including a plurality of storage stations disposed about the core;

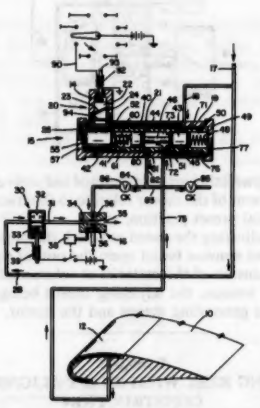
mounting means for mounting the carousel in the aircraft, the carousel rotatably supported thereby;

restraining means, disposed at each storage station, for releasably holding one or more buoys therein, the restraining means comprising a plurality of semi-cylindrical sections, mounted on the central core of the carousel, a matching latch hingedly attached to an end of the section, a releasable catch positioned at the other end thereof, forming an assembly, one or more assemblies included at each station, the restraining means providing access to a buoy restrained thereby; and,

locking means for locking the rotatable carousel at a desired storage station, wherein, the locking means comprise a shaft, disposed in a housing and extendable therefrom, a spring disposed in the housing, about the shaft for biasing the shaft outward of the housing, the shaft matable with a plurality of holes in the bottom platform of the carousel, wherein movement of the carousel aligns a hole with the shaft, allowing the shaft to enter the hole and prevent rotation of the carousel, a handle, attached to the shaft allowing the shaft to be removed from the hole, releasing the carousel.

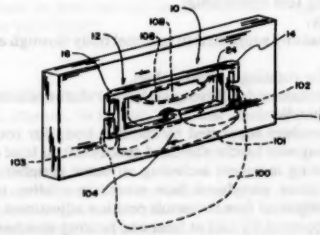
5,160,102
CONTROLLER VALVE FOR DEICER
Kenneth A. Hlavac, Pearisburg, Va., assignor to The B. F. Goodrich Company, Akron, Ohio
Filed Oct. 28, 1991, Ser. No. 783,650
Int. Cl.[5] B64D *15/00*
U.S. Cl. 244—134 A 11 Claims

1. A controller valve for regulating the inflation and deflation of inflatable members of a pneumatic deicer, said controller valve having an inner housing with a longitudinally extending bore, an end cap on each end of said inner housing to cooperate with said bore to define a closed chamber, an annular abutment in said closed chamber, said inner housing having an inlet port and a pair of outlet ports communicating with said bore, said inlet port operatively connected to a pressurized source of fluids, one of said outlet ports operatively connected to said inflatable members, the other one of said outlet ports connected to a vacuum line, a pair of axially spaced spool valves movably located in said bore, first spring means located between said spool valves operative to bias said spool valves away from each other into their first respective positions wherein one of said spool valves blocks said inlet port while interconnecting said pair of outlet ports, each of said spool valves having a recess on their respective ends that cooperates



with said end caps to define a first chamber and a second chamber, a second spring means located in said first chamber and operatively engaging said one spool valve to maintain said one spool valve in said first position, passageway means interconnecting said first chamber to said one outlet port operative for equalizing the pressure in said first chamber to the pressure in said inflatable member, and a solenoid operated valve operative upon actuation to direct pressurized fluid to said second chamber to move said spool valves into a second position to direct pressurized fluid from said inlet port to said one outlet port while blocking said other one of said outlet ports thereby inflating said inflatable members.

5,160,103
BAG HOLDER
George T. Breitenstein, Apt 1408 Namsan Mansion; 726-74 Hannam Dong, Yongsan-Ku; Seoul, Rep. of Korea
Continuation of Ser. No. 689,538, Apr. 23, 1991, Pat. No. 5,085,385. This application Dec. 10, 1991, Ser. No. 804,459
Int. Cl.[5] B65B *67/00*
U.S. Cl. 248—100 11 Claims



1. A bag holder for use with a bag having at least one hand grip, in combination with a handle having a finger receiving

opening; a shelf having an edge; a cabinet door having an edge, said bag holder comprising:

an elongated body having a first end, a mid-portion and a second end;

said elongated body include a top and a bottom;

a first and a second bag grip receiving means for securely and supportingly receiving the hand grip of the bag positioned at said first and said second end, respectively, of said elongated body and wherein said first and second bag grip receiving means defines a first and a second open-loop, respectively, with each open-loop including a tensioned entry point to permit in use an intended passage of a portion of each respective hand grip of the bag into and out of the open-loop to further aid in retaining the hand grip within said open-loop;

an extending means for enabling said first bag grip receiving means to move axially relative to said second bag grip receiving means such that in use when the first hand grip of the bag is received by said first bag grip receiving means and the second hand grip of the bag is received by said second bag grip receiving means the distance separating said first and said second bag grip receiving means may be varied to maintain the opening of the bag in an open position to facilitate the placing of objects therein and to accommodate in use different sizes of bags;

a channel formed in said bottom of said elongated body;

a flat shaped tongue having a flat shape in order to be received in use by a finger opening of a handle secured to the cabinet to thereby secure said holder to the cabinet with said flat shaped tongue being positioned at said mid-portion of said elongated body;

"C" shaped tongue positioned at said mid-portion of said elongated body with said "C" shaped tongue being configured such that in use the edge of the cabinet door is securingly received thereby, to attach said bag holder to the cabinet;

"L" shaped tongue positioned at said mid-portion of said elongated body with said "L" shaped tongue being configured such that in use the top edge of the cabinet is securingly received thereby, to attach the bag holder to the cabinet;

said flat shaped tongue further including a rail;

said "C" shaped tongue further including a rail;

said "L" shaped tongue further including a rail to enable in use one of said rails of one of said tongues to be slidably received into said channel formed in said elongated body to securely position one of said tongues in said elongated body to permit axial movement of the tongue between said first end and said second end of said elongated body to enable said elongated body to be positioned away from an adjacent cabinet door such that the adjacent cabinet door may be opened or closed without interference from said bag holder and to permit said holder to be securely attached to one of said handle having a finger receiving opening, said shelf having an edge and said cabinet door having an edge.

5,160,104

VERTICALLY ADJUSTABLE HOLDER

Joseph M. Sher, 6161 NW. 57 Ct., #309, Tamarac, Fla. 33319

Continuation-in-part of Ser. No. 260,244, Oct. 20, 1988, Pat. No. 5,039,044. This application Aug. 8, 1990, Ser. No. 564,767

Int. Cl.[5] F16M *11/00*

U.S. Cl. 248—176 **4 Claims**

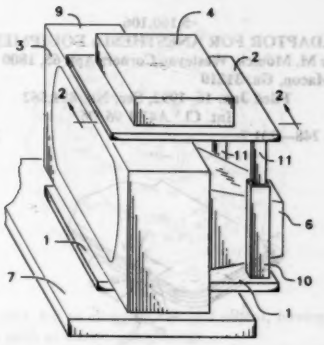
1. A holder apparatus for positioning an item above an appliance, which comprises:

a) a substantially flat, horizontal base portion having an upper surface and a lower surface;

b) the appliance having a bottom, top, front, rear and sides, the bottom of the appliance supported upon the upper surface of the horizontal base portion;

c) a substantially horizontal platform having an upper surface and a lower surface, with the upper surface sized to support said item thereon;

d) two substantially vertical base members with one end of each vertical base member secured to the base portion and the opposite end of each vertical base member extending upward from the base portion to a height less than the height of the appliance; and two substantially vertical platform members with one end of each platform member secured to the platform and the opposite end of each



vertical platform member extending downward from said platform to a height less than the height of the appliance, said platform members sized to be aligned with and closely received in said vertical base members adjustably positioning the platform, with at least a portion of the lower surface of the platform resting upon the top portion of the appliance, and to support the item upon the upper surface of the platform in a substantially horizontal position.

5,160,105

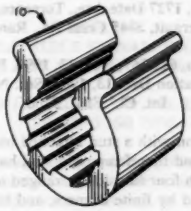
PROTECTIVE FOOT DEVICE FOR MOUNTING ON FURNITURE

Robert H. Miller, Schaumburg, Ill., assignor to Nu-Zip Dee Mfg., Inc., Elk Grove Village, Ill.

Continuation-in-part of Ser. No. 506,440, Apr. 6, 1990, abandoned, which is a continuation-in-part of Ser. No. 418,745, Oct. 3, 1989, abandoned, which is a continuation of Ser. No. 196,304, May 20, 1988, abandoned. This application Apr. 23, 1991, Ser. No. 690,374

Int. Cl.[5] A47B *91/00*

U.S. Cl. 248—188.9 **20 Claims**



1. A dual durometer protective foot device for axially mounting on a tubular floor contacting member of a piece of furniture, said foot device comprising: a generally cylindrically shaped body portion of a first durometer material having an inner surface and terminating in two end sections defining an axially extending gap, and a second durometer material extending inwardly from the inner surface of said first durometer

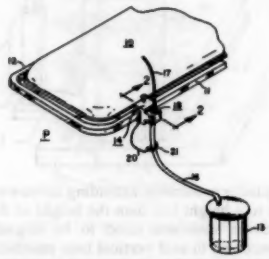
material and having an inner diameter slightly smaller than the outer diameter of the tubular floor contacting member, said second durometer material restricting rotational and axial movement of said foot device with respect to the floor contacting member when said foot device is mounted thereon, said second durometer material only being positioned close to one of said end sections such that stress in said body portion due to deformation thereof when mounted on the tubular floor contacting member does not crack said body portion causing failure thereof.

5,160,106

ADAPTOR FOR ANESTHESIA EQUIPMENT

Michelle M. Monick, Wesleyan Corners Apt. 65, 1800 Wesleyan Dr., Macon, Ga. 31210

Filed Jan. 16, 1992, Ser. No. 821,562
Int. Cl.[5] A47B *96/06*
U.S. Cl. 248—231.7 **10 Claims**



1. Apparatus for use with a patient on an operating from table in connection with an anesthesia machine comprising a support member for suction tubing and a catheter, means for clamping said support member to the operating room table, a passageway through said support member for receiving one end of the suction tubing to be connected to the catheter, the catheter having one end for insertion in the patient's mouth and the other end for connection to the one end of the suction tubing, and means connected with the one end of the suction tubing and the other end of the catheter for preventing the catheter from passing through said passageway, said passageway being constructed and arranged so that the tubing can be pulled up through said support member to permit the catheter to reach the mouth of the patient and when released will slide back down and stop at the catheter so as to be readily available for re-use.

5,160,107

OVERHEAD HANGER

Frederick Perrault, 1727 Date Ave., Torrance, Calif. 90503, and Raymond E. Perrault, 3845 Crest Rd., Rancho Palos Verdes, Calif. 90274

Division of Ser. No. 611,767, Nov. 13, 1990, Pat. No. 5,088,675. This application Dec. 13, 1991, Ser. No. 807,277
Int. Cl.[5] F16L *3/00*
U.S. Cl. 248—327 **6 Claims**

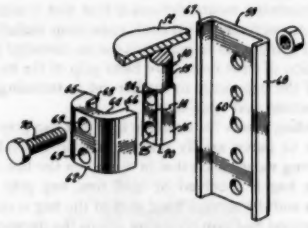
1. In combination with a stud attached to a supporting surface so as to depend therefrom, said stud having a lower portion provided with four flat sides arranged in a square pattern and interconnected by finite corners, and having at least one opening extending transversely therethrough and interconnecting two of said flat sides, a supporting device comprising

a channel having a central web and two spaced flanges extending therefrom,

said central web having a plurality of openings therethrough,

said central web engaging one of said sides of said stud with one of said openings in said central web aligned with said opening in said stud and said side flanges spaced from two additional sides of said stud,

a U-shaped member having a central portion having at least one opening therethrough, and overlying the side of said portion of said stud opposite from said one side with said opening in said central portion aligned with said opening in said stud,



said U-shaped member having side flanges overlying said additional sides of said stud and being received within and adjacent said flanges of said channel, and

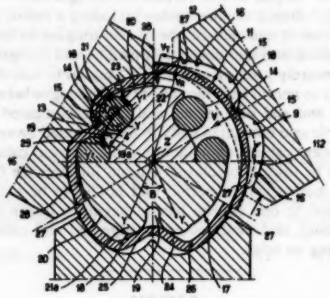
a fastener extending through said opening in said central portion, said opening in said stud and said one opening in said web, thereby to secure said channel to said stud and preclude substantial relative movement therebetween.

5,160,108

PROCESS AND TOOL FOR PRODUCING A BARREL FOR A TELESCOPIC UNIVERSAL TRANSMISSION JOINT

Michel Orain, Conflans-Ste-Honorine, France, assignor to Glaenzer Spicer, Poissy, France

Continuation of Ser. No. 602,971, Oct. 26, 1990, abandoned. This application Dec. 19, 1991, Ser. No. 810,437
Claims priority, application France, Nov. 17, 1989, 89 15106
Int. Cl.[5] B21K *21/16*
U.S. Cl. 72—370 **33 Claims**



1. A process for making a barrel for a sliding universal transmission joint, comprising:

providing a barrel blank having a substantially cylindrical lateral wall with an inner face, a shaping mandrel having a plurality of shaping surfaces capable of shaping said inner face of said lateral wall of said barrel blank to define a plurality of tracks having a substantially circular profile extending parallel to the axis of said barrel blank, with each said track extending on one side of a ridge separating said track from another said track on the other side of said ridge, said ridge having a greater radial thickness than the radial thickness of said barrel blank and a plurality of dies disposed circumferentially about said shaping mandrel, said dies having a circumferential play between each other

and pressure surfaces thereon directed toward said shaping mandrel;

placing said substantially cylindrical lateral wall of said barrel blank between said shaping surfaces of said shaping mandrel and said dies; and

shaping said inner face of said lateral wall by simultaneously displacing said dies toward a central axis of said shaping mandrel and compressing said lateral wall of said barrel against said shaping surfaces with said pressure surfaces thereof until said inner face of said lateral wall of said barrel blank defines a plurality of tracks having a substantially circular profile extending parallel to the axis of said barrel blank, with each said track extending on one side of a ridge separating said track from another said track on the other side of said ridge, said ridge having a greater radial thickness than the radial thickness of said barrel blank.

5,160,109

STEEL POST SHORE, OR PROP, FOR SUPPORTING OF FORMWORK IN CONSTRUCTING BUILDINGS

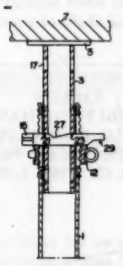
Petrus J. L. de Leeuw, B. van Heesselstraat 5, 5735 AK Aarle-Rixtel, Netherlands

Filed Mar. 26, 1991, Ser. No. 675,137

Claims priority, application Netherlands, Mar. 26, 1990, 9000711

Int. Cl.[5] A47F *5/00*

U.S. Cl. 248—354.4 **5 Claims**



1. Steel post shore, or prop, for supporting of formwork, deckings or the like in constructing buildings, which has two telescopically movable tubes (1, 3), in which the outer tube (1)—at the end of which the inner tube (3) is inserted—is provided with a threaded portion and in which holes (17) are arranged in a longitudinal row along the inner tube, in which a pin (15) in a direction, transverse to the longitudinal direction of the tube can be passed and can be moved therein in its longitudinal direction, which pin (15) can be supported on a socket or ring (12) being screwed onto the outer side of the outer tube, the pin at its circumference, being provided with recesses such that at its displacement in a longitudinal direction the supported inner tube can be inserted a greater distance into the outer tube, characterised, in that after the displacement of the pin (15, 37) from the fully loaded position of the prop to a nearly unloaded position of said prop, this pin (15, 37) takes up a position, in which in relation to the horizontal it is arranged obliquely, or a position in which it is fallen over around its longitudinal axis.

5,160,110

CHRISTMAS TREE STAND

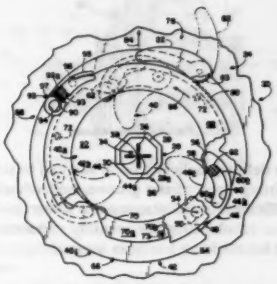
Robert L. Praegitzer, 1270 Monmouth Cut-Off, Dallas, Oreg. 97338-9532

PCT No. PCT/US87/02464, § 371 Date Jan. 14, 1991, § 102(e) Date Jan. 14, 1991, PCT Pub. No. WO89/03004, PCT Pub. Date Apr. 6, 1989

PCT Filed Sep. 25, 1987, Ser. No. 401,433

Int. Cl.[5] F10M *13/00*

U.S. Cl. 248—523 **26 Claims**



1. A stand, for an elongate, upright object, having a lower butt end, such as a tree, comprising:

a base, including object-positioning means for positioning the butt end of the object, a bottom portion carrying said object-positioning means thereon, and a cover secured to said bottom portion with a water-tight seal;

a holding mechanism mounted on said base for holding the object in an upright condition, including plural horizontally opposed gripping arms for gripping the object, with the object received in said base, above the butt end thereof, said arms having a free end for contacting the object and a pivoting end, having pivot means thereon;

ring-like mounting means for pivotably receiving said pivot means;

a cam ring constructed and arranged for rotational movement relative to said mounting means and operable, with said arms and said mounting means, to swing, with relative rotation in one direction, the free ends of the arms into the center of said mounting means, and, with relative rotation in the other direction, to swing the free ends of the arms towards the edge of said mounting means; and

eccentric vertical alignment means operatively connected to said mounting means for adjusting the vertical alignment of the object through horizontal eccentric shifting of said mounting means, wherein said cover includes means for rotatably receiving said vertical alignment means thereon.

5,160,111

COLLAPSIBLE SIGNALLING POST

Denis P. Hugron, 1855, Georges, St-Hubert, Quebec, Canada J4T 1W2

Filed Jan. 21, 1992, Ser. No. 822,712

Int. Cl.[5] F16B *7/00*

U.S. Cl. 248—548 **10 Claims**

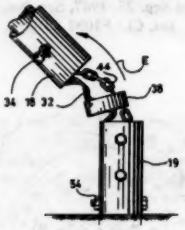
1. A collapsible signalling post comprising,

an anchoring member adapted to be secured into the ground, said anchoring member having an upwardly directed throat member,

a tubular member having a lower part, a middle part and an upper part, said lower part being fixed to said throat member, said tubular member extending upwardly from said anchoring member,

a rod member having a tubular lower end fixed to said upper part of said tubular member, said rod member extending upwardly from said tubular member,

said middle part having an helical groove carved on the periphery of the middle part of the tubular member, said groove defining a weakened section adapted to split open along a portion thereof upon bending caused by a lateral force exerted on said rod member,



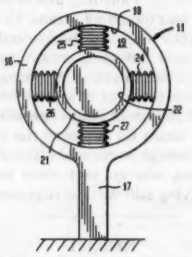
said groove defining helical whorls adapted to stretch away upon splitting open of the groove, said whorls having a width sufficient for maintaining the lower and the upper part of the tubular member securely connected together after said lateral force has been exerted.

5,160,112

MOVING MIRROR CARRIAGE

Anton E. Pritchard, and James A. Pritchard, both of, P.O. Box 17, Norfolk, Mass. 02056

Filed Aug. 13, 1991, Ser. No. 744,266
Int. Cl.[5] A47G *1/16*
U.S. Cl. 248—604 **25 Claims**



1. An apparatus for constraining a device to parallel plane translational movement, said apparatus comprising:

base means;

frame means fixed to said base means and including frame portions defining a periphery of a region;

movable means disposed in said region;

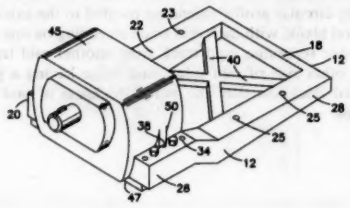
a plurality of primary coupling elements supporting said movable means on said frame portions, each of said coupling elements being capable of bending motion and substantially incapable of twisting motion so as to prevent angular movement of said movable means about either of two mutually perpendicular spatial axes defining a given plane and thereby guide movement of said movable means along a path substantially perpendicular to said given plane and including a series of planes all oriented substantially parallel to each other.

5,160,113

MOUNT FOR DRIVE MEANS AND SPEED CONTROL MEANS

Richard Whiddon, Greenville, S.C., assignor to Reliance Electric Industrial Company, Greenville, S.C.

Continuation of Ser. No. 491,111, Mar. 9, 1990, abandoned. This application Aug. 14, 1991, Ser. No. 744,878
Int. Cl.[5] F16M *1/00*
U.S. Cl. 248—638 **7 Claims**



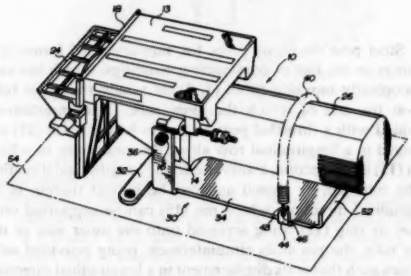
1. An improved mounting system for a drive means and speed control unit comprising a u-shaped frame having a pair of spaced, parallel leg with free ends, said frame having a first section located in a first plane for securement of a speed control means thereto, said first section defining a plurality of fastening member receiving openings therethrough at said free ends, said first section being adapted to be supported on a portion of said speed control means and attached to a support surface by a plurality of fastening members extending through said fastener member receiving openings and fastener openings in said portion of said speed control means, said frame further having a second section integral with said first section and adapted for securement of the drive means thereto, said second section of said frame being cantilevered from said first section and located in a second plane such that said drive means and said speed control means when secured thereto may be interconnected with individual shafts of same in proper operational alignment.

5,160,114

MOUNTING ASSEMBLY FOR HAND-HELD JOINER

Gaylord R. Livingston, P.O. Box 1687, Plattsburgh, N.Y. 12901

Filed Jan. 19, 1991, Ser. No. 638,991
Int. Cl.[5] F16M *1/00*
U.S. Cl. 248—676 **9 Claims**



1. A mounting assembly for mounting onto a mounting surface a hand-held tool having a handle that is removably attached to said tool at at least one mounting point, comprising:

a mounting plate comprising a substantially flat portion and at least one mounting arm extending from said flat portion, said at least one mounting arm having a hole for receiving a fastener; and

means for securing said mounting plate to said mounting surface;

wherein said mounting assembly is adapted to removably engage said tool and said mounting surface in order to mount said tool to said mounting surface with the handle of said tool removed, the flat portion of said mounting plate lying flush against said mounting surface and secured thereto by said securing means, and said mounting arm being attached to said tool at said at least one mounting point by said fastener; p1 and further wherein:

said mounting plate comprises a pair of coupling fixtures;

said assembly further comprises an elongated spring having two opposite ends, each of said ends further having means for engaging a respective one of said fixtures of said mounting plate; and

when said mounting assembly engages said tool, said elongated spring extends around a portion of said tool with said engaging means engaging the respective coupling fixtures of said mounting plate.

5,160,115

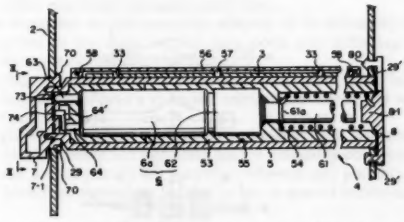
DEVICE FOR OPERATING A DAMPER IN AN AIR CONDITIONING SYSTEM FOR A VEHICLE

Koichi Ito, Kariya; Akihito Higashihara, Chiryu, and Hikaru Sugi, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Dec. 19, 1991, Ser. No. 809,443

Int. Cl.[5] F16K *31/04*; B60H *1/00*

U.S. Cl. 251—129.12 **11 Claims**



1. A flow control apparatus for an air-conditioning system for a vehicle, for controlling a flow of air from a air flow source to a receiver of said flow of air, said flow control;. apparatus comprising:

a casing defining therein a passageway having one end connected to the air flow source and a second end connected to said air flow receiver;

a damper arranged in said passageway for controlling a degree of opening of said passageway, and;

drive means for opening the damper, said drive means comprising a hollow shaft rotatably connected to said casing, said hollow shaft defining therein an axially extending bore and being connected to the damper, and a motor arranged in said bore and having a body and an output shaft rotatable to the body, the output shaft of the motor being connected in relation to said casing and the motor body being fitted to the hollow shaft, whereby an energization of the motor body obtains a relative rotation of the body and the output shaft, which allows the hollow shaft to be rotated with respect to said casing to thereby move the damper for an operation thereof.

5,160,116

ELECTROMAGNETIC VALVE

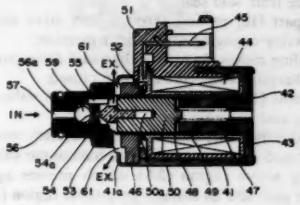
Kiyohiko Sugiura, Hekinan; Nobuaki Miki, Kariya; Takeshi Nasu; Masayuki Sugiura, both of Anjo, and Masao Saito, Nishio, all of Japan, assignors to Aisin AW Co., Ltd., Japan

Filed Dec. 28, 1990, Ser. No. 633,617

Claims priority, application Japan, Dec. 28, 1989, 1-338193

Int. Cl.[5] F16K *31/06*

U.S. Cl. 251—129.14 **4 Claims**



1. An electromagnetic valve comprising:

a cylindrical casing defining a longitudinal axis;

a core mounted in said casing;

an electromagnetic coil disposed between said casing and said core;

a plunger mounted radially inward of said electromagnetic coil for sliding movement along said axis, said plunger including a section of non-magnetic material;

a coil spring disposed along said axis between said core and said plunger;

an outer valve body connected to said casing and having an axial recess in one end thereof and an inlet providing fluid communication between said recess and an external fluid source and a flange at one end thereof;

an inner valve body fitted within and closing said recess and having an axial bore to permit said plunger to be extended into said recess;

a ball contained in said recess for opening and closing said inlet responsive to engagement and disengagement by the non-magnetic section of said plunger;

an annular yoke fitted within said cylindrical casing between said flange and said electromagnetic coil, said yoke having inner and outer cylindrical surfaces and a shoulder on a radially extending surface facing said flange, whereby the axial dimension of said outer cylindrical surface is less than that of said inner cylindrical surface, said flange mating with said shoulder; and

a sleeve provided between said plunger and said yoke for guiding movement of the plunger, said sleeve having one end connected to the core and extending axially beyond said core to an opposite end received within said yoke.

5,160,117

BOTTOM-OF-VAT VALVE

Alain Besombes, Montigny les Bretonneux, France, assignor to Alsthom Fluides Sapag, France

Filed Aug. 22, 1991, Ser. No. 748,608

Claims priority, application France, Aug. 22, 1990, 90 10559

Int. Cl.[5] F16K *7//12*

U.S. Cl. 251—144 **3 Claims**

1. A bottom-of-vat valve disposed beneath a vat (2) and forming an internal cavity (8) communicating with said valve via a controlled orifice (5), a deformable membrane (3) having a moving active region (3A) for closing said controlled orifice, a valve body (1) disposed beneath said vat (2) at a margin of an opening through the vat, said body partially defining said internal cavity (8) into which three openings open out, said openings constituting:

said controlled orifice (5) putting said vat and said internal cavity into communication via said opening through said vat;

a complementary orifice (6) putting said internal cavity in communication with an outside space; and

a drive opening (1B);

said valve body constituting a shutter seat (1A) around said controlled orifice;

said valve further comprising:

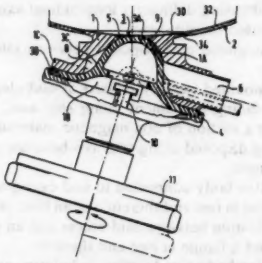
a shutter member (3) movable between an advanced position in which said shutter member engages said shutter seat to shut said controlled orifice, and a retracted position at a distance from said seat;

a drive part (10) passing through said drive opening and operatively engaging said shutter member;

drive sealing means (3) for enabling said drive part to move while keeping said drive opening closed;

drive means (11, 12) disposed outside said valve body for driving said drive piece;

said shutter member and said drive sealing means being constituted by said deformable membrane (3) having a moving active region (3A) which presses against said shutter seat, and an annular peripheral region (3B) which



surrounds the active region and which presses against the margin of said drive opening (1B) to close said drive opening, said exposed surface presenting, both in the advanced position and in the retracted position of the shutter member, a bell-shape, rising smoothly from said peripheral region to a top of said bell-shape, said valve body (1) being generally bell-shaped on a substantially plane annular base (1C) constituting the margin of said drive opening (1B), said controlled orifice (5) being formed in the vicinity of the top of said bell-shape and being angularly offset relative to said top so that when said valve body is disposed to place said controlled orifice at the top of said internal cavity (8), and when said controlled orifice (5) is closed by said active region (3A) of said membrane (3), an annular intermediate region (3C) of said membrane constitutes a sloping floor defining a portion of said internal cavity (8) around said active region (3A), said complementary orifice (6) being formed within said body in contact with the lowest point of said floor so that said internal cavity (8) empties via the emptying duct under gravity.

5,160,118

PIPELINE VALVE APPARATUS

Gary M. Stary, 636 Thorn Hollow Dr., Coraopolis, Pa. 15108

Filed Dec. 17, 1991, Ser. No. 809,720

Int. Cl.[5] F16K *1/22*

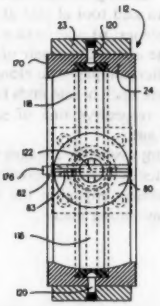
U.S. Cl. 251—173 **9 Claims**

1. A valve apparatus for controlling flow through a pipeline comprising:

a valve body constructed for insertion into said pipeline and having a control shaft bore, a slave shaft bore and a valve bore having a central plane which is perpendicular to the axis of the pipeline, said valve bore comprising a spherical valve surface which is truncated by two planes which are parallel to and on opposite sides of said central plane, said valve surface also including a valve seat which comprises a cylindrical surface intersecting said central plane and said spherical surface;

a control shaft rotatably mounted through said control shaft bore;

a slave shaft rotatably mounted through said slave shaft bore;



a valve member comprising a disk which is operably mounted within said valve bore between said slave shaft and said control shaft for rotation by said control shaft between an open and a closed position relative to said valve seat.

5,160,119

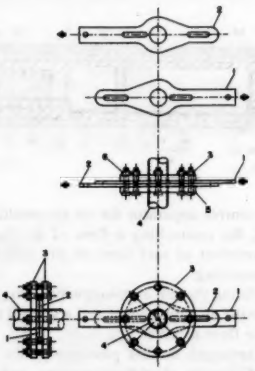
SLIDE PLATE ADJUSTABLE ORIFICE

Robert J. Lemire, and John J. Hannick, both of P.O. Box 299, Kings Park, N.Y. 11754

Filed Oct. 18, 1991, Ser. No. 778,523

Int. Cl.[5] F16K *3/32, 31/50*

U.S. Cl. 251—212 **3 Claims**



1. Apparatus for controlling the flow of fluids or other materials in piping or conveying systems which comprises:

(a) two specially designed half plates, which may be coated or impregnated with a sealing material, each having a fluid hole, an alignment or adjusting hole for positioning the half plates, two slotted bolt holes arranged such that the two half plates, when placed face to face and inserted between flanges, can be aligned such that the fluid holes are either lined up with the center of the flange hole or are offset in opposite directions so as to partially or fully close off the available flowing area formed by the two half plates, while also providing adequate sealing over the full range of the half plate movements;

(b) two oversized flanges, which may be coated or impregnated with a sealing material, each having appropriate numbers of bolt holes, fastening devices, fluid hole, and adequate sealing surface within the inner bolt circle to accommodate the full range of movement of the two half plates.

5,160,120

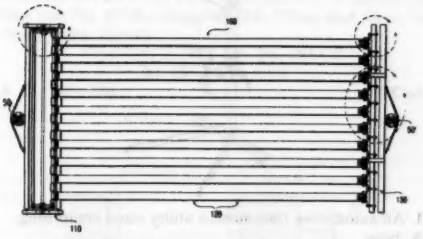
SELF RETRACTING PORTABLE CATTLE GUARD

Cecil R. Sims, 2311 W. Relation St., Safford, Ariz. 85546

Continuation-in-part of Ser. No. 430,009, Nov. 1, 1989, abandoned. This application Jan. 23, 1991, Ser. No. 644,775

Int. Cl.[5] A01K *3/00*

U.S. Cl. 256—17 **2 Claims**



1. A self retracting, portable cattle guard for use in combination with a pair of spaced gate posts for preventing cattle from passing between the space between the two gate posts which define a gate opening; wherein, the cattle guard comprises:

an elongated reel mechanism adapted to be releasably secured to one of said gate posts and including a rotatable reel;

a grid comprising a plurality of relatively widely spaced, flexible, grid straps operatively attached on one end to said reel mechanism and operatively connected on the other end to an elongated cross bar;

an elongated anchor assembly adapted to be releasably secured to the other of said gate posts and including an elongated cross piece member;

spring means operatively associated with said reel for biasing said grid into a retracted relationship relative to said reel; and

a plurality of hooks operatively associated with said cross piece member and said cross bas for releasably connecting the grid to the anchor assembly; wherein said plurality of hooks are secured to said cross bar at spaced locations.

5,160,121

SHOCK ABSORBING COMPRESSIONAL MOUNTING APPARATUS

Donald D. Bartholomew, Mt. Clemens, Mich., assignor to Proprietary Technology, Inc., Southfield, Mich.

Filed Mar. 25, 1991, Ser. No. 674,200

Int. Cl.[5] F16B *23/00*

U.S. Cl. 267—136 **11 Claims**

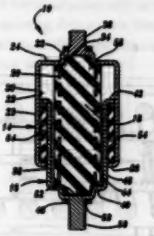
1. A shock absorbing compressional mounting apparatus, said apparatus comprising:

a mounting housing having a first housing portion and a second housing portion, said first and second housing portions positioned such that one is slidable within the other;

an elastomer member disposed at least partially within said first and second housing portions such that said first and second housing portions each surround a portion of said elastomer member;

an elongated, serpentine-shaped spring disposed within said elastomer member; and

whereby disposition of said elastomer member between opposing surfaces moving relative to each other operates to provide variable damping of the relative movement of said opposing surfaces as a force causing said relative



movement increases and decreases in magnitude relative to a predetermined magnitude of force.

5,160,122

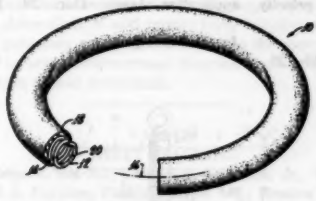
COIL SPRING WITH AN ELASTOMER HAVING A HOLLOW COIL CROSS SECTION

Peter J. Balsells, P.O. Box 15092, Santa Ana, Calif. 92705, assignor to Peter J. Balsells and Joan C. Balsells, Santa Ana, Calif.

Filed Mar. 20, 1990, Ser. No. 496,329

Int. Cl.[5] F16F *1/06*

U.S. Cl. 267—167 **21 Claims**



1. A spring assembly comprising:

a plurality of coil means, interconnected with one another in a spaced-apart relationship, for causing the spring assembly to exert a force in a loading direction approximately normal to a tangent to a centerline of said plurality of coil means in response to deflection of the spring assembly along said loading direction; and

elastic material means, disposed around and between said plurality of coil means and having a hollow cross-section, for modifying the force exerted by the spring assembly in response to deflection of the spring assembly along said loading direction.

5,160,123

VELOCITY-CONTROLLED RAILWAY BUFFER

Sten H. Danieli, Norra Liden 27, Gothenburg, Sweden S-411 18

Continuation-in-part of Ser. No. 466,423, filed as PCT/SE88/00476, Sep. 14, 1988, abandoned. This application Dec. 28, 1990, Ser. No. 635,940

Claims priority, application Sweden, Sep. 16, 1987, 8703589

Int. Cl.[5] B60G *15/06*

U.S. Cl. 267—226 **13 Claims**

1. A hydraulic buffer, comprising

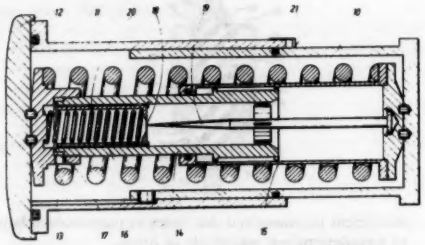
a housing,

a plunger slidably disposed in said housing and moveable at a movement speed relative to said housing, said plunger dividing said housing into two chambers, each of said chambers adapted to contain a fluid,

passage means for defining a first fluid flow path between said chambers,

throttle means for throttling the flow of said fluid through said passage means,

shunt means for defining a second fluid flow path between said chambers so that there is a relationship between fluid flow rate through said second fluid flow path and pressure



difference between said chambers and so that said relationship varies dependent upon the position of said plunger with respect to said housing.

5,160,124

CLAMPING APPARATUS FOR WORK

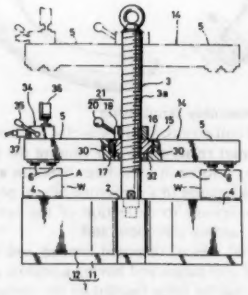
Sohei Yamada, and Hideaki Yokota, both of Kobe, Japan, assignors to Kabushiki Kaisha Kosmek, Hyogo, Japan

Filed Dec. 12, 1991, Ser. No. 805,658

Claims priority, application Japan, Dec. 28, 1990, 2-406309[U]

Int. Cl.[5] B23Q *3/06*

U.S. Cl. 269—25 **6 Claims**



1. A clamping apparatus for a work comprising:

a base plate (1) having a central portion (2) and a peripheral portion;

a pillar (3) projecting upwardly from the central portion (2) of said base plate (1), said pillar (3) being composed of an externally threaded rod defining a longitudinal axis;

at least two work receiving portions (4)(4) peripherally spaced apart in the peripheral portion of said base plate (1);

a pressing unit including a central portion (16) which is threadably mounted about said pillar (3) at least two pressing arms (5)(5) radially from said central portion (16) toward said work receiving portions (4)(4), said pressing unit being rotatable about and vertically displaceable relative to the longitudinal axis of said pillar (3) through the threaded connection between said central portion (16) and said pillar (3); and

a pressing means (6) supported by each of said pressing arms (5), each of said pressing means facing said work receiving portion (4) from above and being displaceable, relative to its respective pressing arm (5), toward and away from said work receiving portion (4).

5,160,125

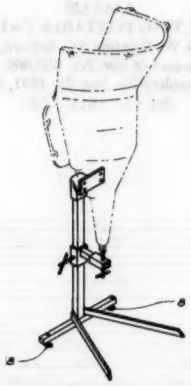
TRANSMISSION UTILITY STAND

Bobby L. Jenkins, P.O. Box 982, Inola, Okla. 74036

Filed Feb. 23, 1990, Ser. No. 484,062

Int. Cl.[5] B66F *3/00*

U.S. Cl. 269—50 **2 Claims**



1. An automotive transmission utility stand comprising:

A. base;

B. upright stanchion connected to the base; and

C. transmission mounting bracket attached to the upper portion of the stanchion, said bracket having a means to be removably attached to the rear mount of a transmission;

wherein the stanchion is tilted toward the center of the base.

5,160,126

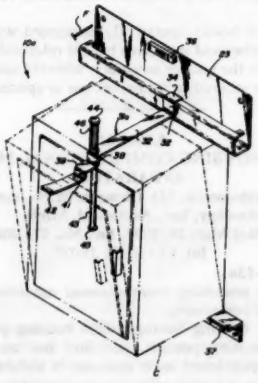
CABINET MOUNTING APPARATUS

Peter Atkinson, 536 Leetes Island Rd., Branford, Conn. 06405

Filed Feb. 20, 1992, Ser. No. 837,941

Int. Cl.[5] B25B *5/14*

U.S. Cl. 269—102 **8 Claims**



1. A cabinet mounting apparatus, comprising,

a mounting plate, the mounting plate including a plurality of spaced bores directed therethrough, the mounting plate including a plate bottom wall integrally and orthogonally mounted to a lower edge of the mounting plate extending forwardly thereof defined by a predetermined first width, and

a plate forward wall integrally and orthogonally mounted to

a forward edge of the plate bottom wall arranged in a parallel, coextensive, and confronting relationship relative to the mounting plate, wherein the forward wall is defined by a predetermined height, and

a mounting plate top wall integrally and orthogonally mounted to an upper edge of the forward wall extending towards the mounting plate in an orthogonal relationship spaced therefrom a predetermined distance, and a channel defined between the mounting plate, the bottom wall, the forward wall, and the top wall, and

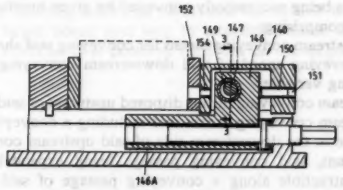
a securement leg pivotally mounted within the channel extending forwardly of the forward wall, wherein the securement leg includes at least one abutment plate spaced from the forward wall.

5,160,127

HOLD-DOWN DEVICE FOR MOVABLE JAW OF A VISE

Philip Lin, No. 537-8, Chung-San Rd., Ching-Shui Chen, Taichung Shien, Taiwan

Filed Oct. 2, 1991, Ser. No. 769,660
Int. Cl.[5] B23Q *3/02*
U.S. Cl. 269—136 **2 Claims**



1. A hold-down device for a movable jaw of a vise comprising:

a driving block (**146**),

said driving block having a through hole,

said through hole lined with a sleeve (**147**) made from a hardened material,

a movable jaw member (**140**) having a drive shaft (**149**) rotatably mounted therethrough,

said rotatably mounted drive shaft (**149**) passing through said through hole of said driving block (**146**),

a first movable jaw adjustment means for engaging said drive shaft (**149**) against said hardened sleeve (**147**) toward a rear end of said movable jaw (**140**) while permitting limited rotation of said drive shaft when said movable jaw member is moved,

a second movable jaw adjustment means for engaging said drive shaft (**149**) against said hardened sleeve (**147**) toward a front end of said movable jaw (**140**) while permitting limited rotation of said drive shaft when said movable jaw member is moved,

wherein, said first movable jaw adjustment means is engaged when the workpiece is held in the vise in compression and said second movable jaw adjustment means is engaged when the workpiece is held in the vise in tension.

5,160,128

CLUTCH DEVICE FOR AUTOMATIC PAPER FEEDER

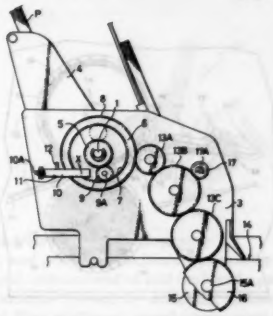
Harumichi Oishi, Higashi-Yamato, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan

Filed Mar. 27, 1991, Ser. No. 675,818
Claims priority, application Japan, Apr. 11, 1990, 2-96829
Int. Cl.[5] B65H *3/06*
U.S. Cl. 271—114 **2 Claims**

1. A clutch device for an automatic paper feeder which includes a feeding roller to hold uniform-size sheets of printing paper between a pressure plate and itself and which separates and feeds one by one to the attached printer through the rotation of said feeding roller, including:

a clutch gear which has an internal gear formed on its inner surface and an external gear formed on its outer surface, said external gear receiving rotary driving force transferred from a drive shaft of a printer body;

a sun gear which is located coaxially with said clutch gear to transfer rotary driving force to a feeding roller shaft supporting said feeding roller and to receive rotary braking force of a braking means;



a planetary gear which is engaged with both said internal gear of said clutch gear and said sun gear; and

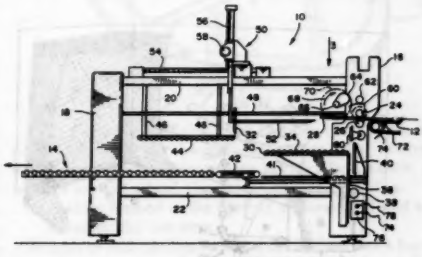
a stopper which inhibits said planetary gear from revolving in a predetermined direction during the reverse rotation of said drive shaft of said printer body but does not inhibit said planetary gear from revolving in the opposite direction to said predetermined direction during the normal rotation of said drive shaft.

5,160,129

SHEET STACKING

Charn Siriporn, Bel Air; Charles S. Milcarek, Jr., Timonium; Ronald J. Norman, Parkton, all of Md.; Randon L. Baum, York, Pa., and Michael G. Holecek, Sparks, Md., assignors to Ward Holding Company, Inc., Wilmington, Del.

Filed Aug. 27, 1991, Ser. No. 750,499
Int. Cl.[5] B65H *29/40*
U.S. Cl. 271—178 **25 Claims**



23. Apparatus for stacking sheets, comprising:

elevator means for receiving sequentially advancing sheets thereon in front edge alignment;

said elevator means being movable downwardly at a substantially constant rate of descent while a stack of said sheets is formed thereon;

flexible means above said stack for flexibly contacting and resiliently urging a trailing edge of each preceding sheet below a leading edge of each succeeding sheet to prevent interference therebetween, during formation of said stack on said elevator means; and

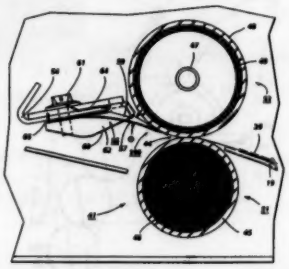
said flexible means comprising are siliently deformable loop.

5,160,130

THIN-TIP STRIPPER FINGER FOR USE WITH A FUSER ROLL IN AN ELECTROPHOTOGRAPHIC APPARATUS

Paul M. Fromm, Rochester, and Timothy R. Jaskowiak, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 25, 1991, Ser. No. 797,668
Int. Cl.[5] B65H *29/54*
U.S. Cl. 271—307 **15 Claims**



1. A stripper member for separating a substrate from a surface of a fuser member, comprising:

a first surface;

a second surface, opposed from the first surface and defining a thickness therebetween;

an edge, shaped in the form of a symmetrical convex arc across the width of the first surface and the second surface;

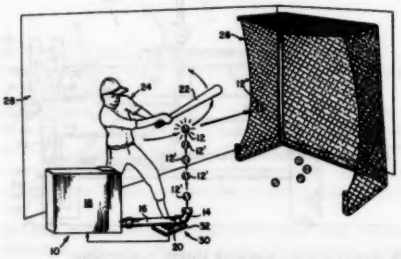
the thickness between the first surface and the second surface decreasing from a chord through the convex arc perpendicular to the axis of symmetry of the arc, to the edge.

5,160,131

METHOD AND APPARATUS FOR IMPROVING BATTING SKILLS

Saturnino Leon, 566 Centre St., Jamaica Plain, Mass. 02130-2068

Filed Jun. 12, 1991, Ser. No. 714,271
Int. Cl.[5] A63B *69/40*
U.S. Cl. 273—26 D **7 Claims**



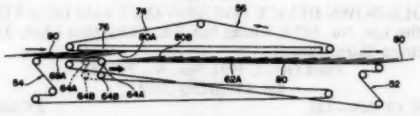
1. Apparatus for use in batting practice comprising means for pneumatically and automatically projecting a series of balls in an upward vertical direction towards a position at which a ball is adapted to be struck by a batter means for adjusting pneumatic pressure such that ball velocity is easily adjusted by pneumatic pressure and such that actuation of ball projection does not throw off batter coordination said projecting means further comprise a downwardly projecting conduit and a substantially horizontally ball projection tube, means for coupling one end of said conduit to said tube, said conduit extending at an inclined angle relative to the longitudinal axis of said tube for movement of balls through said conduit and into said tube, means for producing a flow of gas under pressure through said tube, and means at one end of said tube for redirecting movement of a ball in said tube to a vertical direction.

5,160,132

SHEET CONVEYING/SORTING SYSTEM

Yoshikazu Hanada, Fujinomiya, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 11, 1991, Ser. No. 774,867
Claims priority, application Japan, Oct. 15, 1990, 2-275717; Oct. 2, 1991, 3-254949
Int. Cl.[5] B65H *7/02*
U.S. Cl. 271—265 **5 Claims**



1. A sheet conveying/sorting system for sorting a plurality of sheets being successively conveyed by given numbers, said system comprising:

downstream conveying means for conveying said sheets, the conveying speed of said downstream conveying means being variable;

upstream conveying means disposed upstream of said downstream conveying means and including a conveying passage in the downstream side of said upstream conveying means, said conveying passage being expandable and contractible along a conveying passage of said downstream conveying means;

sucking/conveying means disposed above said conveying passage of said upstream conveying means and said conveying passage of said downstream conveying means for sucking said sheets and conveying said sheets along said conveying passages; and,

control means for counting the number of said sheets conveyed and outputting a separation signal when said number of said sheets conveyed reaches a given number, said separation signal allowing said sucking/conveying means to perform its sucking operation, said separation signal making the conveying speed of said downstream conveying means faster than the conveying speed of said upstream conveying means to thereby separate said sheets from their following sheets, and at the same time said separation signal expanding said conveying passage of said upstream conveying means to thereby convey said following sheets together with said sucking/conveying means, and said control means, after said upstream conveying means is detected by a return detector disposed downstream thereof, for outputting a return signal, said return signal contracting said expanded upstream conveying means to return to its original length before it is expanded, said return signal causing said sucking/conveying means to stop its sucking operation and return to its original position, and at the same time said return signal returning the conveying speed of said downstream conveying means to a speed equal to the conveying speed of said upstream conveying means.

5,160,133

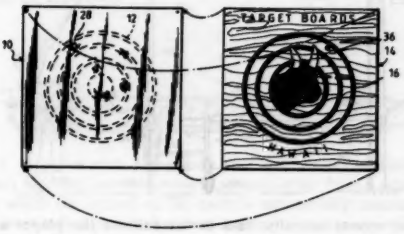
APPARATUS AND METHOD FOR PRESERVING A MARKSMANSHIP TARGET SCORE

Melvin R. Bloom, 49-561 Kam Hwy., Kaneohe, Hi. 96744

Filed Aug. 17, 1990, Ser. No. 568,971
Int. Cl.[5] F41D *1/00*
U.S. Cl. 273—408 **1 Claim**

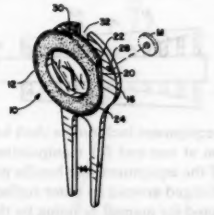
1. A method for preserving a marksmanship target score, which comprises:

(a) shooting a firearm at a thin target with a marked surface mounted on a rear wall of a target range;
(b) placing the thin target with shot holes therethrough over a target board with a matching marked surface;
(c) drilling holes into the target board with an electric drill, through the shot holes in the thin target;



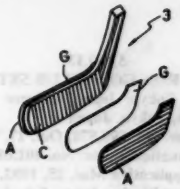
(d) removing the thin target with the shot holes from the target board with matching drilled holes; and
(e) inserting cartridge cases into the drilled holes in the target board part way to establish a three dimensional effect so as to preserve the score on the target board.

5,160,134
COMBINED GOLF GREEN REPAIR TOOL AND TIMEPIECE
Thomas L. McDonald, 35 Montana Trail, Prince Frederick, Md. 20678
Filed Feb. 19, 1992, Ser. No. 836,755
Int. Cl.[5] A63B *57/00*; G04B *47/00*
U.S. Cl. 273—32 B **6 Claims**



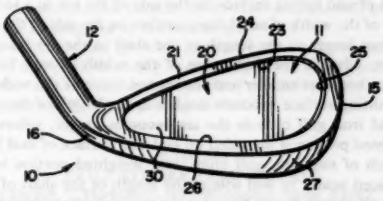
1. A tool for use in the game of golf and providing a means of time determination and further means for the repair of minor depressions in the surface of golf greens and the like, said tool comprising in combination;
a base portion having two tines extending therefrom with said base portion and said tines formed of a single piece of planar sheet material,
a timepiece, said base portion providing for the attachment of said timepiece thereto,
said timepiece including a case having a a face and watch mechanism and having a back removable from said case with said back permanently secured to said base portion in a non-coplanar manner, whereby
said tool is used for minor green repair and for the determination of time by a golfer during a game of golf.

5,160,135
STICK
Shigeji Hasegawa, Chiba, Japan, assignor to Hasegawa Kagaku Kogyo Kabushiki Kaisha, Yachiyo, Japan
Continuation of Ser. No. 281,990, Dec. 9, 1988, abandoned. This application Apr. 2, 1991, Ser. No. 680,013
Claims priority, application Japan, Dec. 11, 1987, 62-313856
Int. Cl.[5] A63B *59/12*
U.S. Cl. 273—67 A **1 Claim**



1. A puck-striking stick comprising:
a shaft, and a blade; said blade comprising a wooden core integral with one end of said shaft and a pair of puck-striking surfaces formed by attaching at least one unidirectional fiber reinforced cured plastic plate to both sides of said wooden core;
wherein grains of said wooden core are oriented in a width direction of said blade;
wherein fibers of said unidirectional fiber reinforced cured plastic plate are oriented in a longitudinal direction of said blade; and
wherein a soft thin film is interposed between said wooden core and said unidirectional fiber reinforced plastic plate.

5,160,136
GOLF CLUB CONSTRUCTION
Kevin D. Eger, 3030 Whetrock La., Sugarland, Tex. 77479
Filed Nov. 28, 1990, Ser. No. 619,053
Int. Cl.[5] A63B *53/00*
U.S. Cl. 273—77 A **3 Claims**



1. In a series of golf club irons between one and ten having progressively shorter lengths and greater lofts, wherein the head of each iron includes a blade having a face, a back, a sole, a top, a toe and a heel, the improvement comprising:
a) cavities formed in the back of a plurality of said blades, including the one iron;
b) each of said cavities having a cavity base and a top edge, a bottom edge, a front edge and a back edge defining a cavity outline, the length of the cavity being measured from front edge to back edge, the width from top edge to bottom edge and the depth from the back of the blade to the cavity base;
c) the length of said cavities becoming progressively shorter as the loft of the club increases so that the centers of gravity of the blades move progressively toward the heel of the blade as the loft of the club increases;
d) the width of said cavities becoming progressively narrower as the loft of the club increases so that centers of gravity of the blades move progressively upwardly away from the sole as the loft of the club increases;

e) the centers of gravity of the blade moving progressively upwardly toward the top and inwardly toward the heel of the blade at approximately a 45° angle from club to club, as the loft of the club increases; and

f) (e)) the outline of the cavity in the one iron is only slightly smaller than the back of the blade.

5,160,137

IRON GOLF CLUB SET

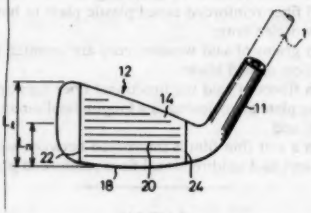
Yutaka Katayama, Tokyo, Japan, assignor to Maruman Golf Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 598,578, Oct. 17, 1990, abandoned, which is a continuation of Ser. No. 401,686, Sep. 1, 1989, abandoned. This application Mar. 25, 1992, Ser. No. 857,129

Claims priority, application Japan, Sep. 2, 1988, 63-218440

Int. Cl.[5] A63B *53/04*

U.S. Cl. 273—77 A **1 Claim**



1. An iron golf club set comprising a plurality of iron golf clubs, each of said iron golf clubs including a shaft and a head attached to said shaft, said head having a hitting surface for hitting a golf ball, a rear surface on the back of said hitting surface, a sole between said hitting surface and said rear surface, a toe and a heel, wherein a ratio of a first value of the width of said hitting surface on the side of the toe to a second value of the width of said hitting surface on the side of the heel becomes larger as the length of the shaft in the set becomes longer, wherein the first value of the width of said hitting surface becomes smaller and the second value of the width of said hitting surface becomes smaller as the length of the shaft of said iron golf club in the set becomes longer, wherein a weighted portion is provided on said rear surface of said head of each of said iron golf clubs, said weighted portion being displaced nearer to said sole as the length of the shaft of said iron golf club in the set becomes shorter, and wherein said rear surface of said head includes a rim wall enclosing a recess, said weighted portion having opposing end portions coupled to said rim wall and traversing across said recess.

5,160,138

ATHLETIC TRAINING DEVICE

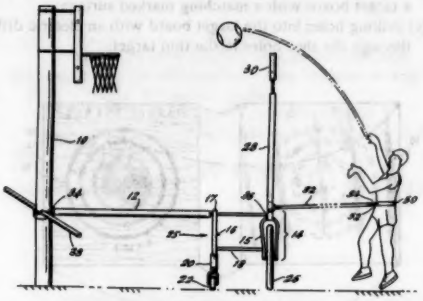
Thomas E. Sanders, 94 Red Fox Rd., Stamford, Conn. 06903

Filed May 31, 1991, Ser. No. 708,691

Int. Cl.[5] A63B *69/00*

U.S. Cl. 273—1.5 A **16 Claims**

1. A basketball training device comprising a mobile carriage; blocking means on the carriage located for blocking a player's basketball shots; means for attaching said carriage to a location associated with the target of the player's basketball shots; and means for attaching said carriage to a player so that when the



player moves laterally, said device follows the player and tends to block the player's shots.

5,160,139

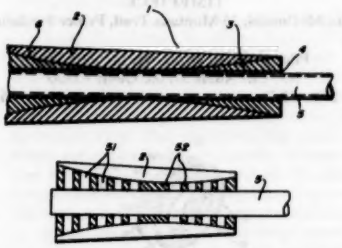
HANDLE DEVICE FOR SPORTS EQUIPMENT SHAFTS

Tsai C. Soong, 1839 Jackson Rd., Penfield, N.Y. 14625

Filed Oct. 15, 1991, Ser. No. 775,450

Int. Cl.[5] A63B *53/14*

U.S. Cl. 273—81 R **5 Claims**



1. A sports equipment including a shaft having a longitudinal handle portion at one end for manipulation by a user during playing use of the equipment, the handle portion comprising a sleeve unit arranged around an outer surface of said end of the shaft and adapted for manual gripping by the user of the equipment, said unit including a sleeve member arranged to encircle the outer surface of said shaft end and an elastic media element arranged between said sleeve member and said outer surface of said end, said sleeve member having an inner surface adjacent to and extending along said elastic media element and being spaced from said outer surface of said shaft end and out of contact therewith, said elastic media element being positioned whereby the manipulation of the handle portion during use of the sports equipment produces relative longitudinal rocking movement between said sleeve member and said one end of the shaft, said inner surface of said sleeve member facing said media element and being shaped such that it is convex towards the media element and wherein the apex of said convex shape of said inner surface of said sleeve member is at the longitudinal center of the sleeve member.

5,160,140

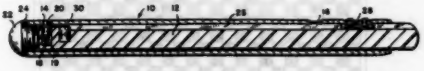
EXPANDABLE BATON WITH SPRING BIASED LATCH MEANS

Paul D. Starrett, Jaffrey, N.H., assignor to Monadnock Lifetime Products, Inc., Fitzwilliam, N.H.

Continuation of Ser. No. 413,826, Sep. 28, 1989, abandoned. This application May 15, 1991, Ser. No. 702,368

Int. Cl.[5] F41B *15/02*

U.S. Cl. 273—84 R **9 Claims**



1. A police club comprising first and second telescoping parts slideably movable relative to each other from a position in which the second of the parts is substantially contracted within the first part to a position in which the parts are substantially totally expanded relative to each other and a radially-disposed, spring-biased pin mounted in the second of the parts and engageable with first and second openings in the first part to hold the parts expanded when the pin is positioned in the first of said openings and contracted when the pin is positioned in the second of said openings, the first of said openings being greater in size than the pin whereby the pin extends through said opening and beyond the opening in the radial direction and wherein the second of said openings is of a size to retain said pin, but prevent it from extending through said second opening, and whereby said second opening has a reverse countersunk shaped wall, whereby the pin can slide out of said second opening along said wall when the first and second telescoping parts are moved apart from one another.

5,160,141

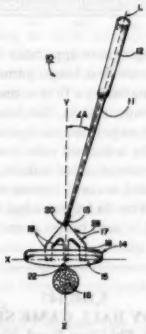
GOLF PUTTER

Debra J. Crews, 1005 Montpelier Dr., Greensboro, N.C. 27410

Continuation of Ser. No. 673,795, Mar. 22, 1991, abandoned. This application Mar. 16, 1992, Ser. No. 852,051

Int. Cl.[5] A63B *53/02*

U.S. Cl. 273—164.1 **14 Claims**



1. A golf putter having a linear shaft, having a rear surface a head, said head having a planar face, a linear neck, said neck separating said shaft from said head, said shaft and said neck uniting to form a joint, the improvement comprising: said neck comprising a plurality of tines, said tines extending rearwardly of said planar face, said linear shaft being rigidly united to said neck at said joint rearwardly of said head, said joint being centered at the intersection of the longitudinal and vertical axes of said face with the rear surface of said shaft proximate said joint defining an extreme rear of said putter whereby the golfers view of said putter head with the putting target during address of the ball is improved to increase putting accuracy.

5,160,142

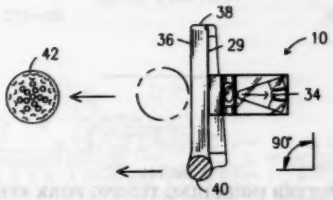
GOLF PUTTING TRAINING DEVICE

Perry C. Marshall, 103 Granada Ct. North, Plant City, Fla. 33567

Filed Dec. 6, 1991, Ser. No. 804,864

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—186.2 **19 Claims**



1. A golf putting training aid, comprising:
a base member;
a wedge-shaped recess formed in said base member;
said recess having a bottom wall;
said recess having a narrow leading end and a wide trailing end;
attachment means for releasably attaching said base member to a putter so that said base member is oriented in a predetermined position relative to said putter;
said narrow leading end of said base member being disposed in leading relation to said wide trailing end of said base member during swinging of a putter toward a golf ball during a putting stroke, said orientation of said base member being said predetermined position;
a plurality of pockets formed in said bottom wall along the trailing end of said recess; and
a generally spherical ball positioned atop said bottom wall;
the structural characteristics of said recess and ball being such that a backswing of said putter having said base member secured thereto drives said spherical ball toward the leading end of the recess; and
the inertia of said spherical member causes it to roll into one of said pockets during said putting stroke of said putter so that a record is thereby created of the path of travel of said putter during said putting stroke.

5,160,143

GOLF STROKE TRAINING AID

Brett Dwyer, 7 Tewksbury Rd., Worcester, Mass. 01602

Filed Feb. 21, 1992, Ser. No. 839,927

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—186.2 **12 Claims**

1. A golf stroke training device for use with the head of a conventional golf club, said head having a front ball striking surface which has a center of percussion, said device comprising:
(a) a body of relatively soft compressible material which includes a pair of opposed spaced vertical legs,
said body having a head portion which extends from the top of one of said legs to the top of the other of said legs, said

head portion having a horizontal aperture which extends along a horizontal axis which is transverse to the front surface of the club head and above said club head when said device is applied to said front surface,

(b) fastening means for releasably fixing said body to the ball striking surface of the putter so that the center of percussion of said surface is intermediate of said legs, and

(c) an elongated rod which extends through said aperture so that said rod extends horizontally and transversely to the front surface of said club head and is located above said center of percussion when said device is attached to said front surface.

5,160,144

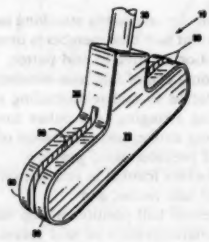
GOLF PUTTER INCLUDING TUNING FORK EFFECTS

Jimmy J. Maniatis, 8010 Dundee, San Antonio, Bexar County, Tex. 78209

Filed Nov. 4, 1991, Ser. No. 787,223

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—186.2 **3 Claims**



1. A putter, comprising:

a head comprising a sole and a neck and having a slice extending through said sole into said neck to provide faces which produce a tuning fork effect when a ball is struck with one of said faces; and

a shaft attached to said head at said neck.

5,160,145

APPARATUS AND METHOD OF PLAYING A BOARD GAME

Bernt Bokhagen, Stockholm, Sweden, assignor to Lyckplay AB, Lycksele, Sweden

PCT No. PCT/SE89/00349, § 371 Date Jan. 23, 1991, § 102(e) Date Jan. 23, 1991, PCT Pub. No. WO89/12485, PCT Pub. Date Dec. 28, 1989

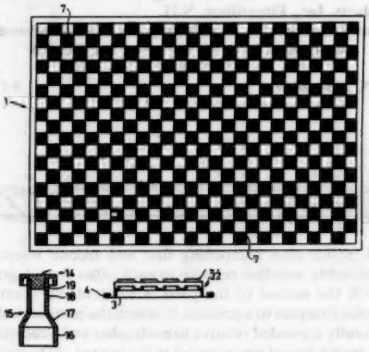
PCT Filed Jun. 19, 1989, Ser. No. 602,256

Claims priority, application Sweden, Jun. 20, 1988, 8802313

Int. Cl.[5] A63F *3/02*

U.S. Cl. 273—260 **22 Claims**

22. A board game comprising a checkered board, a set of game pieces, and a plurality of home areas visible on the board, the perimeter of each home area being sized and shaped to correspond to a plurality of adjacent square spaces on the board, the number of square spaces within each home area being equal to the number of game pieces in a set, and each



home area comprising a stand for supporting the pieces, the number of stands corresponding to the number of home areas.

5,160,146

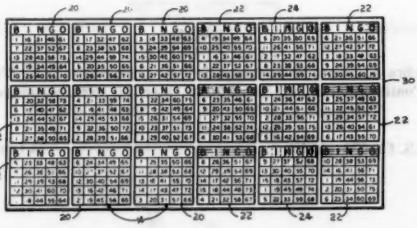
MULTIPLE BINGO GAME APPARATUS

Thomas W. Greer, Muskegon, Mich., assignor to The Reliable Corporation of America, Muskegon, Mich.

Filed Nov. 5, 1991, Ser. No. 788,039

Int. Cl.[5] A63F *3/06*

U.S. Cl. 273—269 **14 Claims**



1. An improved bingo game apparatus comprising a sheet of paper having at least two first bingo game matrices printed on said paper sheet designated by a first common color indicia and at least one second bingo matrix, but less than the number of first bingo game matrices printed on the same side of said paper sheet and designated by a second common color indicia different from said first common color indicia,

wherein said first and second common color indicia represent a different prize to be awarded for a winning combination contained in said bingo game matrix and said second bingo game matrix.

5,160,147

TOY BALL GAME SET

Chen C. Ping, No. 101, Shi Chou Road, Yi Shin Village, Taiping Hsiang, Taichung Hsien, Taiwan

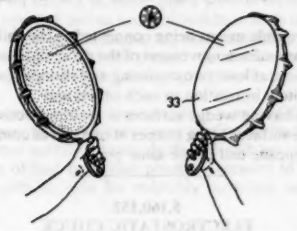
Filed Feb. 10, 1992, Ser. No. 833,495

Int. Cl.[5] A63B *67/00*

U.S. Cl. 273—346 **4 Claims**

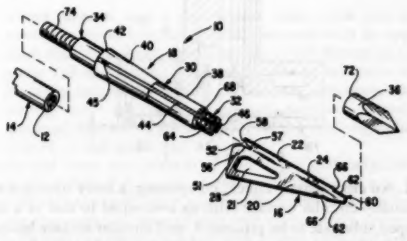
1. A ball game set comprising a racket, and a ball covered with a layer of fastening fabrics, wherein said racket is comprised of a hollow frame having hooks around an outer wall surface thereof and reinforcing ribs around an inner wall surface thereof, a membrane stretched over adds ring-shaped frame at one side an peripherally secured to said hooks, a layer

of fastening fabrics covered over said ring-shaped frame at an opposite side, and a handle transversely extending outwards



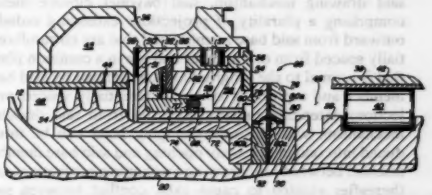
from said ring-shaped frame for holding of the hand, said hollow frame being to define with said membrane and said layer of fastening fabrics a sound chamber.

5,160,148
BROADHEAD ARROWHEAD
John Musacchia, Sr., 3705 SW. 42nd Pl., Gainesville, Fla. 32608
Filed Mar. 10, 1992, Ser. No. 848,164
Int. Cl.[5] F42B *6/08*
U.S. Cl. 273—422 **13 Claims**



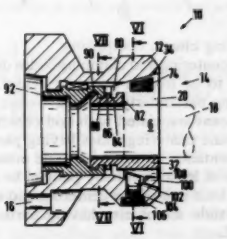
1. A broadhead arrowhead comprising;
a ferrule having a main body provided with an outer periphery, opposite front and rear end portions extending from said main body,
said ferrule including an axial passageway extending substantially through the length of said main body and projecting through said front end portion,
said ferrule main body and front end portion provided with a plurality of outwardly radiating slots communicating with said axial passageway, adjacent pairs of said plurality of slots defining a similar included angle therebetween,
a plurality of individual blade members each including a main body portion joined to an angularly offset mounting flange portion along a longitudinal bend line, said main body portion and mounting flange portion of each said blade member having a substantially equal thickness and defining an included angle therebetween which is equal to said included angle between adjacent pairs of said plurality of ferrule slots,
said slots having a width no less than twice the thickness of any one said blade member main body portion or mounting flange portion,
a plurality of said blade members equal in number to the number of said slots inserted within said ferrule slots with said bend line of each said blade member disposed within said axial passageway and with said main body portion and mounting flange portion of each said blade member occupying adjacent ones of said slots, whereby
with all said plurality of blade members disposed within said plurality of ferrule slots, each said slot is occupied by one said mounting flange portion of one said blade member and one said main body portion of another one said blade member, and
means engaging said ferrule precluding unwanted axial displacement of said blade members disposed within said ferrule slots.

5,160,149
SEAL ROTOR MOUNT
Laurence B. Winn, Phoenix, Ariz., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.
Filed Jun. 21, 1991, Ser. No. 718,713
Int. Cl.[5] F16J *15/34*
U.S. Cl. 277—85 **20 Claims**



1. A gas turbine engine having an axially extending, rotatable shaft; a stationary housing upon which the shaft is mounted to rotate; a first nonrotating, rigid seal member secured to the housing and having a flat, radially extending annular sealing face surrounding the shaft; a second rotatable, rigid seal member having a flat, radially extending annular sealing face; means for axially biasing said flat sealing faces of the first and second members into sealing contact; and an annular, axially thin, nonelastomeric foil affixed to and extending radially inwardly from said second member, said foil being axially clamped to said shaft to drive said second member to rotate with said shaft, said foil being sufficiently thin to distort upon clamping to substantially eliminate transmittal of clamping forces to said second member.

5,160,150
CHUCK
Claus Schmidt, Wilhelmshof-Strasse 34, D-7120 Bietigheim-Bissingen, Fed. Rep. of Germany
Filed Nov. 9, 1990, Ser. No. 614,163
Claims priority, application Fed. Rep. of Germany, Nov. 11, 1989, 3937570
Int. Cl.[5] B23B *31/20*
U.S. Cl. 279—58 **9 Claims**



1. In a chuck for a machine tool, comprising:
a chuck body that is provided with a frusto-conical opening that has a guide surface;
a clamping head that is adapted to be received in said opening of said chuck body and that has a base member with a plurality of circumferentially spaced and radially oriented receiving means, with said clamping head having an axially extending receiving opening for workpieces;

a drawing mechanism for axially reciprocating said clamping head;

said clamping head further comprising gripping jaws provided at said clamping head that have a tapered guide surface for engaging said frusto-conical guide surface and are disposed in a radiallly movable manner in said radially oriented receiving means of said base member of said clamping head, with each gripping jaw having a width that is less than an inner radius of said opening of said chuck body, whereby said jaw guide surfaces contact said guide surface of said opening of said chuck body in a pressure connection;

said receiving means of said base member being open toward an outer side of said clamping head;

coupling means being provided for connecting said gripping jaws with said base member;

a bayonet closure means for connecting said base member to said drawing mechanism, said bayonet closure means comprising a plurality of projections extending radially outward from said base member and that are circumferentially spaced from one another and are in a common plane that is normal to the longitudinal axis defined by said base member and a plurality of circumferentially spaced projections extending radially inwardly from said drawing mechanism, whereby said clamping head can be introduced into said chuck body opening and said base member inserted between said drawing mechanism projections and thereafter rotated to cause axial conflict between said projections of said base member and of said drawing mechanism to axially coupled the same; and

a releasable locking means for securing said clamping head, in an operational state thereof, against rotation.

5,160,151

SELF CENTERING CHUCK

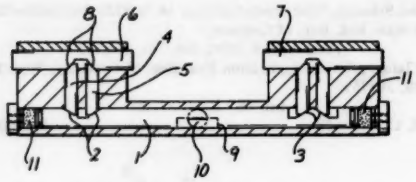
David Fischer, Aschaffenburg, and Rudolf Kohlert, Stockstadt, both of Fed. Rep. of Germany, assignors to Römheld GmbH, Laubach, Fed. Rep. of Germany

Filed Mar. 9, 1990, Ser. No. 491,312

Claims priority, application European Pat. Off., Mar. 9, 1989, 89104172.5

Int. Cl.[5] B23B *31/16*

U.S. Cl. 279—121 **19 Claims**



1. Self-centering chuck, comprising:

a plurality of centering and clamping slides disposed for slide movement to or from a common center, said clamping slides having particularly oriented wedge surfaces;

drive slide means associated with said centering and clamping slides, said centering slides having parallel or slightly oblique orientation to the drive slide means so as to slidingly move at least essentially parallel to the slide movement of at least one of the centering and clamping slides, said drive slide means also having particularly oriented wedge surfaces;

a plurality of shift pins extending transversely to said centering and clamping slides and to the drive side means and cooperating with wedge surfaces of the centering and clamping slides and with the wedge surfaces of the drive slide means, to couple the drive slide means to the centering and clamping slides as associated to obtain movement to or from the center of all centering slides;

said shift pins each moving in one direction in relation to the respective centering and clamping slide when the drive slide means moves in one direction, and said shift pins moving in an opposite direction when the drive slide means moves in the opposite direction, the movements of the pins essentially transversely to the movements of the slides;

said drive slide means being connected to the shift pins such that for uniform movement of the drive slide means in one direction, at least two centering and clamping slides move oppositely in relation to each other; and

said pins having wedge surfaces at their respective ends, the wedge surfaces being steeper at one end as compared with the opposite end of the same pin.

5,160,152

ELECTROSTATIC CHUCK

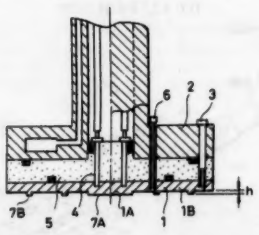
Makoto Toraguchi; Genichi Katagiri, and Yasushi Sakakibara, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Mar. 11, 1991, Ser. No. 667,749

Claims priority, application Japan, Mar. 13, 1990, 2-61681; Jan. 21, 1991, 3-4811

Int. Cl.[5] B25B *11/00*; B23Q *3/15*

U.S. Cl. 279—128 **13 Claims**



1. An electrostatic chuck, comprising: a body having a substantially circular surface with an area equal to that of a disk-shaped substrate to be processed, said circular surface having a plurality of concentric regions including at least an inner region and an outer region, each region having a projected surface which comes in contact with the disk-shaped substrate, at least said outer region having a recessed surface which does not come in contact with the disk-shaped substrate, the projected surface in the outer region occupying a proportion of area of the outer region which is no more than 50% of the proportion of an area occupied by the projection surface in said inner region.

5,160,153

BARROW HAVING HIGH AND LOW POSITIONED WHEELS

Vunshik Zan, P.O. Box 55-1670, Taipei, Taiwan

Filed Sep. 7, 1990, Ser. No. 579,366

Int. Cl.[5] B62B *1/04*

U.S. Cl. 280—43.1 **1 Claim**

1. A barrow comprising:

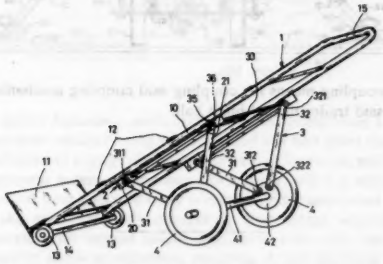
a cart frame having a pair of longitudinal columns formed on right and left sides of said frame, a base platform formed on a bottom portion of said frame, a pair of front wheels formed on a lower portion of said frame, a plurality of pallets transversely formed on said columns, and a handle formed on an upper portion of said frame;

a pair of guide rails respectively secured under said pair of longitudinal columns of said frame;

a supporting link means slidably secured to said guide rails; and two middle wheels rotatably mounted on said supporting link means, a height of a lowest periphery of each said front wheel being higher than a height of a lowest

periphery of each said middle wheel when said handle is operatively depressed downwardly to maintain said frame to be generally horizontal, said supporting link means and said middle wheels being operatively collapsed downwardly for folding purpose upon a vertical erection of said frame; said link means and said middle wheels being operatively slidably extended along said guide rails for evenly supporting a load carried on said frame when said frame is biased downwardly towards a ground where said wheels run;

said supporting link means including a pair of front links, each front link having an upper portion pivotally secured to a front portion of said guide rail and having a lower portion of said front link pivotally secured to a disk secured with an axle for rotatably mounting said middle



wheel thereon, and a pair of rear links, each rear link having an upper portion pivotally secured with an upper shaft slidably moving in a longitudinal slot formed in said guide rail and having a lower portion of said rear link pivotally secured to said disk of said axle, said upper shaft having two opposite outer end portions rotatably mounted with two rollers slidably rolling in a longitudinal groove of said guide rail;

each said outer end portion of said upper shaft adjustably fixed on said rail by an adjusting nut; and said axle for rotatably mounting two said middle wheels thereon having two opposite sides of said axle respectively mounted with said two disks, each said disk having each said lower portion of each said front link and each said rear link pivotally secured to said disk.

5,160,154

HAND TRUCK FOR TRANSPORTING MULTIPLE BINS

Matthew H. Seydel, and Katherine G. Seydel, both of Salinas, Calif., assignors to Curb E-Z, Salinas, Calif.

Filed Sep. 20, 1991, Ser. No. 763,391
Int. Cl.[5] B62B *1/26*
U.S. Cl. 280—47.19 **14 Claims**

1. A hand truck for holding and transporting containers, comprising:

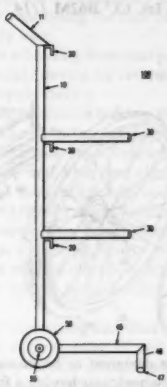
a single longitudinal member having a handle at one end and an axle attached at the distal end, said axle being attached at right angles to said longitudinal member and having wheel mounting means at each end of said axle;

two wheels, said wheels disposed one on each end of said axle;

at least one support means permanently attached to said longitudinal member at right angles to said member and said axle, said support means being disposed mutually orthogonally to said longitudinal member and said axle;

at least one fastening means permanently attached to said longitudinal member at right angles to said longitudinal member and said support means, said fastening means being disposed parallel to said axle and mutually orthogonal to said longitudinal member and said support means, said fastening means having two legs disposed in a right angle forming a right-angle cross section having the said two legs meeting at an apex; and

one linear brace means having one end permanently attached at right angles to said longitudinal member proximal to said axle and at right angle to said axle, said brace means, axle and longitudinal member being disposed mutually orthogonally, said brace means having a vertically



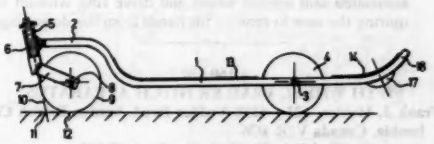
disposed extension parallel to said longitudinal member at the end distal to said attached end, said extension extending in a direction away from said handle and having a length equivalent to the radius of said wheels.

5,160,155

SKATEBOARD HAVING TWO WHEELS IN TANDEM

Jacques Barachet, 46, Résidence de la Porte d'Andin, 78760 Pontchartrain, France

Filed Jan. 11, 1989, Ser. No. 295,711
Claims priority, application France, Jan. 12, 1988, 8800281
Int. Cl.[5] A63C *17/06*
U.S. Cl. 280—87.042 **8 Claims**



1. A skateboard comprising:

a board having a front end for receiving a first foot of a user, a back end for receiving a second foot of a user, and a longitudinal axis;

front and rear wheels having respective axles and positioned in tandem and mounted to said board, said front wheel mounted at said front end and said rear wheel mounted on an axle in an opening in said board provided intermediate said front end and said back end, said wheels being aligned along said longitudinal axis, said rear wheel being mounted with a fixed axis of rotation relative to said longitudinal axis; and

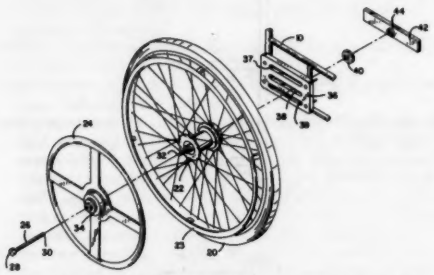
a fork pivotally mounted on said front end of said board and having an axis of pivoting, said front wheel being carried on its axle by said fork and having a point of contact on the ground which is to the rear of an extended point of contact of the axis of pivoting of the fork, whereby said front wheel is self-steering.

5,160,156

WHEELCHAIR WITH COASTING, BRAKING AND MULTI-SPEED FEATURES

Stephen P. Mendon, McFarland, Wis., assignor to Concentric Industries, Clinton, Wis.

Filed Sep. 13, 1990, Ser. No. 581,863
Int. Cl.[5] B62M 1/14
U.S. Cl. 280—250.1 13 Claims



1. In a wheelchair designed to be manually operated by a wheelchair user, the wheelchair having a frame for supporting a pair of first ground-engaging wheels and a pair of second ground-engaging drive wheels, each of the second wheels being mounted for forward and reverse rotation on a coaster hub, the improvement comprising:

a. a pair of drive rings, one each mounted concentric with one of said coaster hubs and in driving relationship therewith when rotated in a forward direction; and

b. control means associated with each of said second wheels and said coaster hubs, wherein the control means and coaster hub of one of said second wheels operate independently of the control means and coaster hub of the other said second wheel, the control means providing a coasting action permitting said second wheels to rotate independently of said drive rings when not physically driven by said drive rings in a forward direction, wherein each control means further includes means intermediate the drive ring and the coaster hub for translating the forward rotational movement of the drive ring to the coaster hub, the means including a plurality of gear sets intermediate each of said coaster hubs and the drive ring for independently selectively altering the drive ratio between the associated said second wheel and drive ring without requiring the user to remove his hands from the drive rings.

5,160,157

FIFTH WHEEL TRAILER HITCH APPARATUS

Frank J. Hubler, 121 - 6338 Vedder Road, Sardis, British Columbia, Canada V2R 1C6

Filed Feb. 28, 1991, Ser. No. 662,181
Int. Cl.[5] B62D 53/04
U.S. Cl. 280—423.1 34 Claims

1. A fifth wheel trailer hitch apparatus for attaching the coupling mechanism of a fifth wheel type trailer to the trunk compartment of a passenger-type motor vehicle, said motor vehicle having a trunk lid to enclose the trunk compartment and said trunk lid having an opening therethrough, said hitch apparatus comprising:

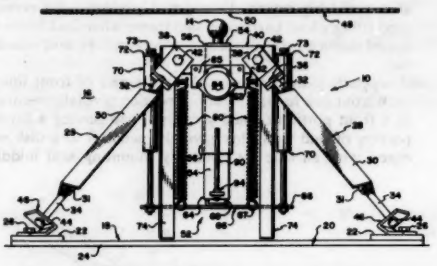
a. a support attachable to said trunk compartment;

b. a platform connected to and supported by said support;

c. a hitch ball mechanism comprising a hitch ball attached to an extension member slideably communicating with said platform for movement of said mechanism between a retracted, lower position and an extended, raised position, said hitch ball positionable below the trunk lid when in the retracted position and positionable above the trunk lid, and extending through the opening, when in the extended position;

d. extended position securing means for securing said mechanism in the extended position;

e. retracted position securing means for securing said mechanism in the retracted position;



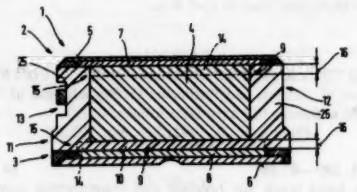
f. coupling means for coupling said coupling mechanism of said trailer to said hitch ball.

5,160,158

MULTI-PLY SKI

Franz Scherübl, Radstadt, Austria, assignor to Atomic Skifabrik Alois Rohrmoser, Wagrain, Austria

Filed Mar. 5, 1991, Ser. No. 665,022
Claims priority, application Austria, Mar. 9, 1990, 575/90
Int. Cl.[5] A63C 5/14
U.S. Cl. 280—610 14 Claims



1. A ski comprising:

a top strap including a top ply;

a bottom strap including a bottom ply;

a longitudinally extending core having a top and bottom disposed between said top and bottom plies, respectively;

plastic foam side walls extending longitudinally along the length of the ski and arranged on each side of said core;

a plastic foam adhesive layer bonding said core to said plies; and

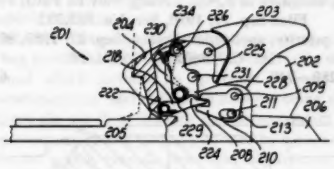
cross-ribs located between the top of said core and said top ply and between the bottom of said core and said bottom ply, said cross-ribs having channels formed therebetween which extend from one of said side walls to the other of said side walls, wherein said plastic foam adhesive layer penetrates the channels and has a thickness determined by the depth of the channels and wherein said plastic foam adhesive layer is the same material as said plastic foam side walls and both are formed in a single production step.

5,160,159

SAFETY FASTENING, PARTICULARLY FOR SKIS

Roberto Gorza, Feltre; Giorgio Baggio, San Martino Di Lupari, and Mirco Battistella, Breda Di Piave, all of Italy, assignors to Nordica S.p.A., Montebelluna, Italy

Filed Mar. 14, 1991, Ser. No. 669,151
Claims priority, application Italy, Mar. 21, 1990, 82541 A/90; Oct. 17, 1990, 82629 A/90
Int. Cl.[5] A63C 9/084
U.S. Cl. 280—632 9 Claims



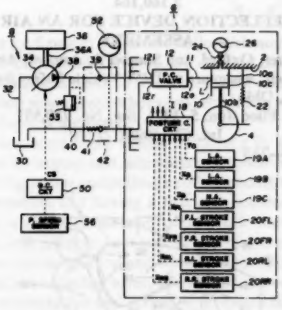
1. Safety fastening, particularly for skis, comprising a rear engagement means having a jaw pivoted at a first pivot thereto and adapted to engage the heel of an item of footwear, said rear engagement means comprising a first body which is slidingly associated with a second body which is rigidly associated with said ski, said first body comprising first means adapted to cooperate with second means associated with said jaw and adapted to allow an automatic resetting of said fastening after a safety release, wherein said first means comprise at least one first pawl which is associated, at one end, with said first body at a second pivot, a first guiding slot for at least one third pivot being defined longitudinally on the body of said first pawl, said third pivot protruding, transversely to said ski, from at least one shoulder which is rigidly associated with said second body, said third pivot engaging a second slot which is defined laterally to said first body along an axis which is longitudinal to said ski.

5,160,160

ACTIVE SUSPENSION SYSTEM

Kazunobu Kawabata, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Sep. 5, 1991, Ser. No. 754,983
Claims priority, application Japan, Sep. 12, 1990, 2-241455
Int. Cl.[5] B60G 21/00
U.S. Cl. 280—707 12 Claims



1. An active suspension system for use in a motor vehicle having a vehicle body and road wheels, said system comprising:

a hydraulic cylinder operatively interposed between said vehicle body and each of said road wheels;

a fluid supply device for feeding said hydraulic cylinder with an working fluid, said fluid supply device having larger and smaller discharge modes;

a fluid supply line extending from said fluid supply device to said hydraulic cylinder for carrying the working fluid to said hydraulic cylinder;

a pressure control valve operatively disposed in said fluid supply line for controlling the flow of the working fluid in the fluid supply line;

a fluid return line extending from said pressure control valve to said fluid supply device for returning the working fluid to said fluid supply device;

a pressure holding system for holding the hydraulic pressure in said hydraulic cylinder, said pressure holding system including a first check valve operatively disposed in said fluid supply line and a second check valve operatively disposed in said fluid return line, said second check valve being of a pilot pressure control type wherein the pressure in said fluid supply line downstream of said first check valve is used as a pilot pressure;

a vehicle posture control means for actively controlling the posture of the vehicle by operating said pressure control valve; and

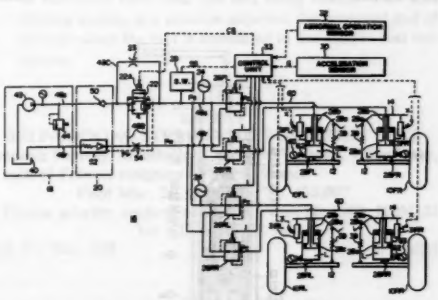
a control unit for controlling said fluid supply device in such a manner that, upon starting of said fluid supply device, said fluid supply device assumes said smaller discharge mode until said second check valve becomes to open and that, upon opening of said second check valve, said fluid supply device becomes to assume said larger discharge mode.

5,160,161

WORKING FLUID CIRCUIT WITH LINE PRESSURE CONTROL FOR VEHICLE ACTIVE SUSPENSION SYSTEM

Masahiro Tsukamoto, and Kazunobu Kawabata, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Feb. 21, 1991, Ser. No. 658,610
Claims priority, application Japan, Feb. 23, 1990, 2-43725
Int. Cl.[5] B60G 11/26
U.S. Cl. 280—707 10 Claims



1. An active suspension system for an automotive vehicle, comprising:

suspension assemblies disposed between a vehicle body and suspension members which respectively support vehicle wheels rotatably, each of the suspension assemblies including a fluid cylinder with adjustable cylinder pressure for active suspension control;

a fluid power source unit which supplies fluid pressurized above a preselected pressure level required for the active suspension control to the fluid cylinders;

a fluid circuit including supply and return lines which communicate between the fluid cylinders and said fluid power source unit for circulating the pressurized fluid therebetween;

line pressure holding means responsive to a line pressure provided to the fluid cylinders lower than a preselected pressure level for holding the line pressure in said fluid circuit;

a pressure sensor which detects the line pressure to provide a signal indicative thereof;

an abnormal operation sensor which detects malfunction of system operation to provide a signal indicative thereof;

valve means including an orifice and a fail-safe valve, the orifice being disposed in the supply line which provides fluid flow at a first flow rate, the fail-safe valve being arranged parallel to said orifice for providing fluid flow at a second flow rate higher than the first flow rate, said fail-safe valve having first and second valve positions, the first valve position being to block the fluid flow at the second flow rate and the second valve position being to allow the fluid flow at the second flow rate, said fail-safe valve means being adapted to establish the first valve position when system operation starts; and

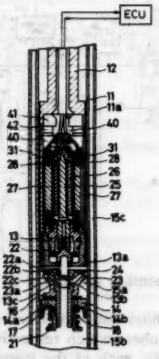
a controller responsive to the signal from said abnormal operation sensor to provide a first control signal to the fail-safe valve for blocking the supply line of said fluid circuit downstream from said line pressure holding means and connecting the blocked supply lines upstream and downstream from said fail-safe valve with the return line respectively, said controller being further responsive to the signal from said pressure sensor to determine an operation status of said line pressure holding means to provide a second control signal to the fail-safe valve to change from the first valve position to the second valve position when operation of the line pressure holding means is released.

5,160,162

SHOCK ABSORBER PRODUCING VARIABLE DAMPING FORCE

Naoki Mouri, Kariya; Kouji Hirao, Chiryu, and Mutsuro Aoyama, Nagoya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 20, 1991, Ser. No. 672,633
Claims priority, application Japan, Mar. 21, 1990, 2-71695
Int. Cl.[5] B60G *11/26*
U.S. Cl. 280—707 **7 Claims**



1. A shock absorber producing a variable damping force, comprising:

a cylinder;

a piston slidably fitted in the cylinder and partitioning the inside of the cylinder into two hydraulic chambers;

a passage permitting the two hydraulic chambers to communicate with each other;

damping force-varying means for varying the area of the passage;

acceleration-detecting means positioned in the cylinder for detecting vibration of the shock absorber; and

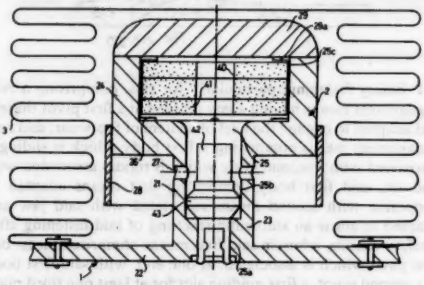
control means for controlling the damping force-varying means in accordance with the vibration detected by the acceleration-detecting means.

5,160,163

IMPACT-ABSORBING DEVICE FOR OCCUPANTS OF A MOTOR VEHICLE AND USE OF THIS DEVICE

Bernard Castagner, Coupvray; Paul-Philippe Cord, Paris; Bernard Doin, Versailles, and Michel Kozyreff, Catenay, all of France, assignors to S.N.C. Livbag, Vert Le Petit, France

Filed Sep. 17, 1990, Ser. No. 583,332
Claims priority, application France, Sep. 27, 1989, 89 12629
Int. Cl.[5] B60R *21/26, 21/28*
U.S. Cl. 280—740 **6 Claims**



1. Impact-absorbing device (1) for the occupants of a motor vehicle comprising a hot-gas pyrotechnic generator (2) including an igniter (42) and a hot-gas generating pyrotechnic composition (40) and an inflatable bag (3) fastened to the said generator, wherein:

the said pyrotechnic composition is chosen from the group consisting of composite powders and powders with two bases, the flame temperature of which is equal to at least 1,800° C.,

the said inflatable bag is a virtually sealed bag,

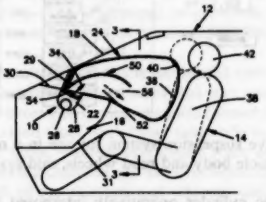
the inflatable bag communicates with the said hot-gas generator by means comprising at least one opening (27) with virtually constant cross section arranged on the generator and a deflector (28) wherein the said inflatable bag contains a product capable of absorbing or dissociating carbon monoxide.

5,160,164

GAS DEFLECTION DEVICE FOR AN AIR BAG ASSEMBLY

Kurt F. Fischer, Oxford, and Samuel A. Awotwi, Auburn Hills, both of Mich., assignors to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio

Filed Jun. 5, 1991, Ser. No. 710,557
Int. Cl.[5] B60R *21/20*
U.S. Cl. 280—743 **25 Claims**



1. A vehicle air bag assembly comprising a container, a folded air bag disposed in said container, an inflator disposed at

least partially in said container, and a deflector disposed within said container;

said inflator being adapted to discharge a gas flow which forces said air bag and said deflector through a portion of said container to form a deployment opening to inflate said air bag;

said air bag being designed to be inflated to a predetermined geometric form for restraining a vehicle occupant who is pitched forward during a vehicle collision, said predetermined geometric form including a torso-contact area which is disposed at a predicted location of the torso of said vehicle occupant while being pitched forward during a vehicle collision;

said deflector being disposed within said air bag when said air bag is inflated and defining at least part of a deflection channel which includes an upstream end and an open downstream end, said deflection channel being shaped to redirect the gas flow towards said torso-contact area;

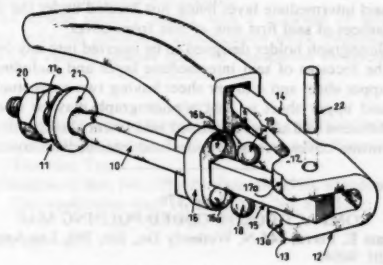
said upstream end being partially defined by a portion of said deflector which extends from said deployment opening when said air bag is inflated.

5,160,165

DEVICE FOR FIXING IN POSITION AN ADJUSTABLE STEERING COLUMN OF AN AUTOMOBILE VEHICLE

André Hoblingre, Valentigney, France, assignor to ECIA, France

Filed Nov. 8, 1991, Ser. No. 789,679
Claims priority, application France, Nov. 9, 1990, 90 13929
Int. Cl.[5] B62D 1/18
U.S. Cl. 280—775 12 Claims



1. Device for fixing in position an adjustable steering column of an automobile vehicle, relative to a steering column support structure which is connected to a structure of said vehicle and comprises two side members between which side members said steering column is disposed,

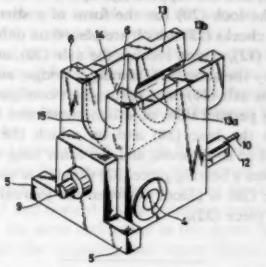
said device comprising means for fixing in position said column by urging said side members towards each other, said fixing means comprising a rod extending between said side members and having a first end portion for bearing against a first side member of said side members and a second end portion, eccentric fixing means connected to said second end portion and comprising at least one eccentric cam, an actuating lever, said at least one eccentric cam being connected to said actuating lever and to said second end portion of said rod, and for bearing against a second side member of said side members of said structure for urging said side members towards each other and thereby fixing the column in position, and a rolling member for interposition between said at least one eccentric cam and said second side member of said support structure.

5,160,166

LIMIT SWITCH UNIT AND PASSIVE SEAT BELT ASSEMBLY EQUIPPED WITH THE SAME

Shinobu Mogi, Fujisawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 492,070, Mar. 12, 1990, abandoned.
This application Aug. 16, 1991, Ser. No. 749,498
Claims priority, application Japan, Mar. 14, 1989, 1-28119[U]
Int. Cl.[5] B60R 22/06
U.S. Cl. 280—804 9 Claims



1. A passive seat belt system of the type that a movable anchor with a webbing connected thereto is moved by a drive member along a rail between an occupant-restraining position and an occupant-releasing position, said system comprising:

a limit switch unit disposed within a casing near one end of the rail, said limit switch unit comprising:

(i) limit switch means for detecting the arrival of the movable anchor at the occupant-restraining position or the occupant-releasing position;

(ii) housing means for housing the limit switch means within the casing; and

(iii) guide means defined by said unit for guiding the drive member into the rail, said guide means being formed integrally and of one piece with said housing means; and

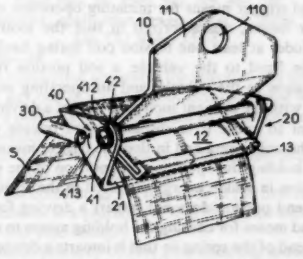
a cover tube for guiding the drive member between a drive means for the drive member and a proximal end of the rail, and said guide means having a portion for holding one end of the cover tube, said one end being remote from said driving means, at a position adjacent the proximal end of the rail when the unit is assembled in the passive seat belt system.

5,160,167

SELF-LOCKING STRAP GUIDE FOR A SEAT BELT

François Fourrey, Montbeliard, and Roel Verhoog, Valentigney, both of France, assignors to ECIA, France

Filed Mar. 26, 1991, Ser. No. 675,007
Claims priority, application France, Mar. 30, 1990, 90 04123
Int. Cl.[5] B60R 22/36
U.S. Cl. 280—806 18 Claims



1. Self-locking strap guide (S) for a seat belt, said guide being

adapted to be fixed to a vehicle structure or shell (C) and comprising:

a base (10) with a flange (11) for mounting on the structure or shell (C), and with a support (12) against which the strap (S) can be pressed;

a lock (20) with a shoe (21) articulated via an axle (30) on the base (10) such that the strap (S) can pass between the support (12) and the shoe (21), and such that the shoe (21) can press the strap (S) against the support (12); and

elastic stressing means (40) tending normally to move the shoe (21) and the support (12) apart;

wherein the lock (20) has the form of a stirrup with two parallel cheeks (22) which are placed on either side of the support (12), which receive the axle (30), and which are joined by the shoe (21) forming a bridge; and

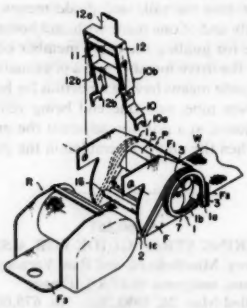
wherein the axle (30) has a rectangular configuration, one of the long parallel sides of which constitutes a journal (31) fixed to the base (10) and on which the lock (20) is mounted so as to pivot, and the other long side of which constitutes a bearing piece (32) situated in such a way that the lock (20) is placed between the journal (31) and the bearing piece (32).

5,160,168

PRETENSIONER FOR A VEHICLE SAFETY BELT SYSTEM

Muneo Nishizawa, and Hideaki Yano, both of Shiga, Japan, assignors to Takata Corporation, Tokyo, Japan

Filed Feb. 25, 1991, Ser. No. 661,059
Claims priority, application Japan, Mar. 1, 1990, 2-50441
Int. Cl.[5] B60R *22/46*
U.S. Cl. 280—806 **8 Claims**



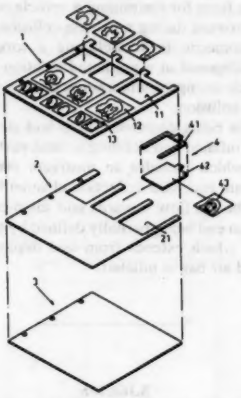
1. A pretensioner for a vehicle safety belt system for tightening a webbing that restrains a vehicle occupant by displacing an element of the belt system in a manner such as to tighten the webbing and including motive power means for displacing the element and trigger means for initiating operation of the motive power means, characterized in that the motive power means includes at least one torsion coil spring having a base end portion fixed to the vehicle; a soil portion retained in guided relation to the vehicle, and an operating end portion associated with the element such as to impart a driving force to the element to cause it to displace upon release of energy stored in the coil spring and in that the trigger means includes means for holding the operating end portion of the spring in a fixed position in which energy is stored in the spring and the operating end portion does not impart a driving force to the element and means for causing the holding means to release the operating end of the spring so that it imparts a driving force to the element.

5,160,169

HAIR STYLE ALBUM

Hsuan-Chun Juan, P.O. Box 82-144, Taipei City, Taiwan

Filed Apr. 20, 1992, Ser. No. 871,836
Int. Cl.[5] B42D *1/00*
U.S. Cl. 281—15.1 **1 Claim**



1. A hair-style album comprising:

a front cover provided with three rows of lattices, each lattice of the first row being fitted with a transparent film on which is printed a hair style, each lattice of the second row being provided with a photograph of a model, and the lattices of the third row having a photograph showing lateral view and rear view of the model;

an intermediate layer mounted under said front cover and having three recesses on the upper side, the recesses of said intermediate layer being just located under the three lattices of said first row of said front cover;

a photograph holder designed to be inserted into any one of the recesses of said intermediate layer and including an upper sheet and a lower sheet having two arms stuck on said upper sheet so that a photograph may be inserted between said upper sheet and said lower sheet; and

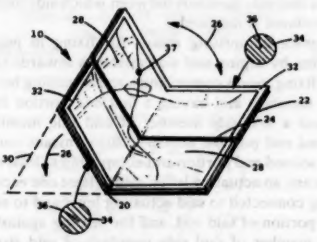
a bottom cover arranged under said intermediate layer.

5,160,170

COMPACT COLOR-CODED FOLDING MAP

William E. Ferra, 144 N. Wetherly Dr., Ste. 201, Los Angeles, Calif. 90048

Filed Oct. 18, 1991, Ser. No. 778,671
Int. Cl.[5] G09B *29/00*
U.S. Cl. 283—35 **3 Claims**



1. A compact color-coded folding map comprising in combination:

(a) a one-piece map displaying encompassing local around a specific location;

(b) visible lines on said map as fold indicators for folding said map in successive stages from said one-piece into a small booklet-like package;

(c) colored edge strips each of a particular color arranged to frame each said successive folded stage of said map, said strips framing each folded stage with a single color, each said successive folded stage framed with a different color;

(d) said map when folded into said small booklet-like package having plain cover areas provided for informational printing thereof;

(e) said map when unfolded in said successive stages, each stage displaying successively increased enlargements expanding the scope of said map relative to said specific location;

(f) said colored edge strips being a particular color for each said successive map fold stage providing locational information for each said successive map fold stage and being color-coded guidelines additional to said visible lines for refolding said map from said one-piece map back to said small booklet-like package.

5,160,171

SECURITY CODING

Peter Gregory, Bolton, and Arthur Quayle, Holcombe Brook, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 332,597, Apr. 3, 1989, abandoned. This application Feb. 6, 1991, Ser. No. 652,260

Claims priority, application United Kingdom, Apr. 5, 1988, 8807937; Oct. 17, 1988, 8824293

Int. Cl.[5] B42D *15/00*

U.S. Cl. 283—91 **13 Claims**

1. A method of security coding an article comprising the steps of:

(i) applying to the article an identification mark comprising at least one colorless or weakly colored infra-red absorbing material; and

(ii) disguising said material by means of a visually opaque infra-red transparent foreground.

8. An article security coded with a colorless or weakly colored infra-red absorbant identification mark disguised by means of a visually opaque infra-red transparent foreground.

5,160,172

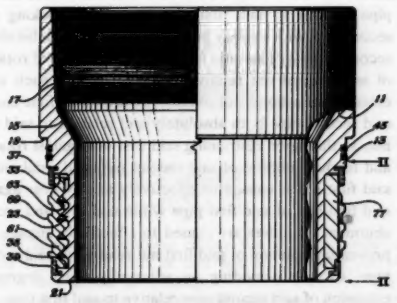
THREADED LATCH RING TUBULAR CONNECTOR

James A. Gariepy, Cypress, Tex., assignor to ABB Vetco Gray Inc., Houston, Tex.

Continuation of Ser. No. 629,429, Dec. 18, 1990, abandoned. This application Jan. 14, 1992, Ser. No. 821,121

Int. Cl.[5] F16L *15/00*

U.S. Cl. 285—18 **2 Claims**



1. In a tubular connection joint for connecting between two tubular members of a type having a pin member on one of the tubular members, a box member on the other of the tubular members for receiving the pin member, a longitudinal axis, and a split latch ring carried by the pin member for releasably securing the tubular members together, the improvement comprising in combination:

a set of helical pin threads formed on the exterior of the pin member, each of the pin threads having an upper flank facing upward and outward that is a single continuous conical surface;

a set of helical box threads formed in the interior of the box member, each of the box threads having a lower flank that is perpendicular to the axis;

each of the pin threads and the box threads being separated by a root and each having a crest, the distance from crest to crest on the pin threads being the same as the distance from crest to crest on the box threads;

a set of helical external latch threads formed on the exterior of the latch ring for engaging the box threads, the external latch threads each having an upper flank that is perpendicular to the axis for engaging one of the lower flanks of the box threads;

a set of helical internal latch threads formed in the interior of the latch ring for engaging the pin threads, each of the internal latch threads having a lower flank that faces downward and inward and is a single continuous conical surface at the same inclination as the upper flanks of the pin threads for engaging the upper flanks of the pin threads;

each of the internal threads and external latch threads having a crest, the crests of the internal and external latch threads being radially aligned with each other;

upper and lower retainers located above and below the latch ring for carrying the latch ring on the pin member, the upper and lower retainers being spaced axially apart a distance greater than the axial extent of the latch ring to allow selected axial movement of the latch ring relative to the pin member;

an axially extending key slot formed on the exterior of the pin member;

a drive key located in the key slot in engagement with both the latch ring and the pin member for causing the latch ring to rotate with the pin member; and

the engagement of the internal latch threads with the pin threads allowing sufficient play for the latch ring to retract when the pin member stabs into the box member, with subsequent rotation of one of the tubular members relative to the other causing the lower flanks of the internal latch threads to slide downward and outward on the upper flanks of the pin threads and causing the upper flanks of the external latch threads to bear tightly against the lower flanks of the box threads, each the conical surfaces of the internal latch threads and the pin member engaging each other when the connection joint is fully made up.

5,160,173

SELECTIVE PIPE CONNECTION APPARATUS WITH MULTIPLE FLUID INLETS AND OUTLETS

Eugene Le Devehat, Saligny, France, assignor to FMC Corporation, Chicago, Ill.

Filed Feb. 26, 1991, Ser. No. 661,798

Claims priority, application France, Mar. 8, 1990, 90 03050

Int. Cl.[5] F16L *35/00*

U.S. Cl. 285—26 **18 Claims**

1. A pipe connection apparatus for selective and temporarily connecting any one of a plurality of first fixed pipe sections to any one of a plurality of second fixed pipe sections, said apparatus comprising:

a) an ordered plurality of first articulated pipe sections each having a first and a second end;

b) means for connecting the first ends of the first articulated pipe sections to a plurality of first fixed pipe sections, one end to one pipe section;

c) an ordered plurality of first pipe coupling sections;

d) means for connecting the first pipe coupling sections to

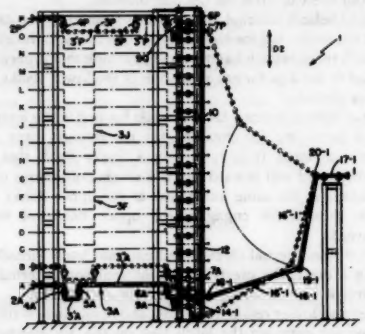
the second ends of the first articulated pipe sections, one coupling section to one pipe section;

e) means for supporting the first pipe coupling sections in an ordered and movable array defining a first imaginary plane;

f) an ordered plurality of second articulated pipe sections each having a first and a second end;

g) means for connecting the first ends of the second articulated pipe sections to a plurality of second fixed pipe sections, one end to one pipe section;

h) an ordered plurality of second pipe coupling sections;



i) means for connecting the second pipe coupling sections to the second ends of the second articulated pipe sections, one coupling section to one pipe section;

j) means for supporting the second pipe coupling sections in an ordered and movable array defining a second imaginary plane parallel to the first imaginary plane; and

k) means for connecting the first pipe coupling sections to the second pipe coupling sections in an imaginary coupling plane intermediate and parallel to the first and second imaginary planes.

5,160,174

TELESCOPING PIPES AND APPLICATION FOR SUCH TELESCOPING PIPES IN FIRE SPRINKLER SYSTEMS

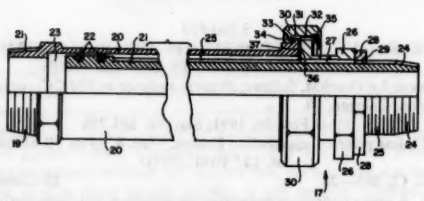
William Thompson, 36 Trinidad Way, Happy Valley, South Australia 5159, Australia

Filed Nov. 29, 1990, Ser. No. 619,841

Claims priority, application Australia, Nov. 29, 1989, PJ7620

Int. Cl.[5] F16L *27/12*

U.S. Cl. 285—32 **8 Claims**



1. A telescopic pipe arrangement, comprising:

a first pipe having two axially opposite ends and a longitudinal bore having an inner peripheral wall;

a second pipe having two axially opposite ends and a longitudinal bore having an inner peripheral wall;

said second pipe being coaxially telescopically received in said longitudinal bore of said first pipe, so that a first end portion including a first end of said second pipe protrudes axially beyond a first end of said first pipe, and a second end portion including said second end of said second pipe is disposed within said longitudinal bore of said first pipe distally of said first end of said first pipe;

sealing means circumferentially sealing between said second end portion of said second pipe and said inner peripheral wall of said longitudinal bore of said first pipe;

means defining a first band of helical threading externally on said second pipe between said sealing means and said first end of said second pipe;

a first internally threaded nut threadedly engaged on said first band of helical threading axially adjacent said first end of said first pipe;

means defining a second band of helical threading externally on said first internally threaded nut;

a second internally threaded nut threadedly engaged on said second band of helical threading;

an external radial flange provided on said first pipe adjacent said first end of said first pipe and having a first abutment shoulder facing axially away from said first end of said first pipe;

said second internally threaded nut including an internal radial flange disposed on an axially opposite side of said external radial flange of said first pipe from said first end of said first pipe, and having a second axially facing abutment shoulder arranged to engage said first abutment shoulder of said external radial flange upon movement of said second nut axially towards said first end of said pipe upon corresponding rotation of said first nut relative to said second pipe;

means for locking said first nut with respect to said second nut upon achieving a first degree of relative threaded rotation of said first nut relative to said second nut such as to advance said first nut axially towards said first end of said second pipe both absolutely and relative to said second nut, so that upon rotation of said first nut in one direction, said first pipe first causes an axial end of the first nut to effectively bear axially against said first end of said first pipe, with said first and second abutment shoulders effectively disengaged, and, upon further rotation in said one direction, causes increased axial extension of said second pipe relative to said first pipe, and rotation of said first nut in an opposite direction on said first pipe first causes said first and second abutment shoulders to effectively engage, with said axial end of said first nut effectively no longer bearing axially against said first end of said first pipe, and, upon further rotation in said opposite direction, causes increased axial retraction of said second pipe relative to said first pipe, and for unlocking said second nut with respect to said first nut upon achieving a second degree of initially forced relative threaded rotation of said second nut relative to said first nut, such as to extend said second nut axially towards said first end of said second pipe both absolutely and relative to said first nut, so that upon restraining said first nut against rotation and further rotation of said second nut, said axial end of said first nut is caused to effectively axially bear against said first end of said first pipe while said first and second abutment shoulders are caused to effectively engage, for preventing rotation of said first nut relative to said second pipe, thereby providing an adjustedly fixed degree of extension of said second pipe relative to said first pipe; and

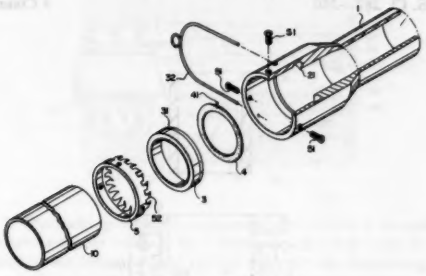
means selectively operable for preventing rotation of the second pipe relative to the first pipe for preserving said adjustedly fixed degree of extension of said second pipe relative to said first pipe.

5,160,175

QUICK PIPE COUPLING WITH INFLATABLE SEAL AND PIN RETAINER

Ming-Tung Yang, No. 4-3 Lane 97, Lung Chuan Street, Panchiao, Taipei Hsien, Taiwan

Filed Aug. 22, 1991, Ser. No. 748,507
Int. Cl.[5] F16L *17/00*
U.S. Cl. 285—104 **7 Claims**



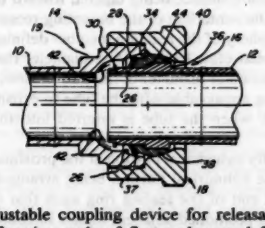
1. A pipe coupling comprising:
a chamber, defining a longitudinal axis for receiving a pipe to which the pipe coupling is to be secured;
an annular inflatable sealing tube seated in said chamber and adapted to extend about the pipe;
a first ring received within said chamber and adapted to receive said pipe and abut said sealing tube;
a second ring received within said chamber and adapted to receive said pipe, said second ring including a plurality of locking teeth arranged to be biased by said first ring into locking engagement with said pipe;
means for fixedly securing said second ring to said pipe coupling with said sealing tube, said first ring, and said second ring longitudinally spaced within said chamber; and
means for inflating said sealing tube in order to bias said first ring into engagement with said second ring thereby causing said plurality of locking teeth to securely engage said pipe.

5,160,176

METAL SEAL BALL JOINT COUPLING ASSEMBLY

Edwin J. Gale, Aurora, Colo., assignor to Stanley Aviation Corporation, Aurora, Colo.

Filed Nov. 18, 1991, Ser. No. 793,578
Int. Cl.[5] F16L *15/02*
U.S. Cl. 285—165 **6 Claims**



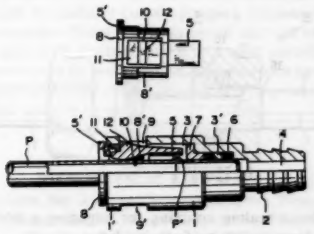
1. An adjustable coupling device for releasably interconnecting confronting ends of first and second fluid carrying conduits, said device comprising:
a bell flange attached to the confronting end of one of said conduits, said bell flange having a lip and an arcuate, internal sealing surface adjacent said lip and a recess extending inward longitudinally from said arcuate sealing surface;
a sealing flange, having an inner end and an outer end, attached to the confronting end of the other of said conduits which is sized to be received within said bell flange and has an outer surface with a peripheral abutment spaced from said inner end thereof;
a sleeve mounted on the end of said sealing flange and having a curved outer surface facing toward said outer end of said sealing flange and an inner surface engageable with said abutment to limit the inward movement thereof;
a normally flat sealing ring mounted on said sealing flange adjacent said sleeve and having peripheral edges engageable with said arcuate sealing surface of said bell flange and said surface of said sealing flange when said flanges are drawn together; and an abutment means adjacent said inner end of said sealing flange for preventing removal of said sealing ring and said sleeve therefrom;
a nut on said sealing flange threadably connected to said bell flange, said nut having a curved inner surface facing toward said inner end of said sealing flange and engageable with said curved outer surface of said sleeve to urge said peripheral edges into said sealing engagement and to prevent outward movement of said sleeve and to allow an angular adjustment of the axes of the conduits at said coupling device, said sleeve, bell flange, nut and sealing ring being longitudinally adjustable along said sealing flange from a position where said inner surface engages said abutment to a position where said sealing ring engages said abutment means.

5,160,177

CONNECTOR FOR CONNECTING SLENDER PIPING MEMBERS WITH CANTILEVER MECHANISM

Katsushi Washizu, Numazu, Japan, assignor to Usui Kokusai Sangyo Kaisha Limited, Japan

Filed Jan. 4, 1991, Ser. No. 637,459
Claims priority, application Japan, Jan. 20, 1990, 2-11490
Int. Cl.[5] F16L *37/00*
U.S. Cl. 285—319 **6 Claims**



1. A connector for connecting a slender piping member, said piping member having a connecting end and an annular ridged wall in proximity to the connecting end, said connector comprising:
a connector body having opposed leading and rear ends, a communication hole extending axially into the leading end of the connector body, a circumferential wall extending forwardly from the rear end of the connector body and defining a stepped larger-diameter chamber extending axially into the rear end of the connector body and communicating with said communication hole, a pair of opposed engagement holes formed through the circumferential wall, portions of the circumferential wall rearward of each said engagement hole defining a retaining wall at the rear end of the connector body; and
a separate socket body having a generally cylindrical wall with opposed front and rear ends, the front end of the cylindrical wall defining an annular root disposed in the chamber of the connector body, a pair of opposed cutaway apertures defining respective perimeters which extends through the cylindrical wall of the socket body

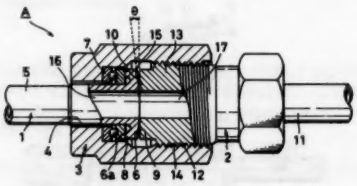
intermediate the front and rear ends thereof and in alignment with the opposed engagement holes of the connector body, tongue-shaped walls extending rearwardly and radially outwardly from the annular root and in alignment with the cut-away apertures in the cylindrical wall of the socket body, said tongue-shaped walls including rear ends disposed respectively in the engagement holes of the connector body and against the retaining wall at the rear end of the connector body for retaining the socket body in the connector body, a pair of pawl walls aligned with the respective tongue-shaped walls and projecting forwardly and radially inwardly from the annular root, the tongue-shaped walls and the pawl walls being pivotable about the annular root at the front end of the cylindrical wall of the socket body such that movement of the tongue-shaped walls radially inwardly generates a radially outward movement of the pawl walls, said tongue-shaped walls and said annular root are encompassed by said perimeter, whereby the pawl walls lockingly engage the annular ridged wall on the piping member to lockingly retain the piping member in the connector body, and whereby radially inward movement of the tongue-shaped walls generates corresponding radially outward movement of the pawl walls for selectively disengaging the piping member from the connector body.

5,160,178

DIRECT SEALING COUPLING

Toshiaki Iwabuchi, Chigasaki, Japan, assignor to Kabushiki Kaisha COM, Japan

Filed Dec. 17, 1991, Ser. No. 809,008
Int. Cl.[5] F16L *25/00*
U.S. Cl. 285—328 **2 Claims**



1. A direct sealing coupling for engaging a body with a sleeve to form sealing by fastening force,

the body comprising a substantially flat body having a sealing surface at one end a borethrough and a male thread;

the sleeve having a bore therethrough and having at one end a flange which comprises with an annular projection at one side to act as a belleville spring, the flange having at the other side a sleeve sealing surface which has a conical shape which is deformable to be substantially flat when pressed;

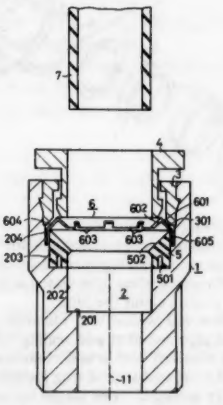
a connecting portion of the body and the sleeve being surrounded by a female nut, a female thread of which is engaged with said male thread on the body, thereby forming a seal between the body sealing surface and the sleeve sealing surface at the juncture of said bores, said bores being of the same size thereby providing a smooth uninterrupted path through said body and sleeve without circumferential dead space when a fastening force is applied onto the annular projection of the flange, a thrust bearing being provided between the female nut and the annular projection whereby to prevent rotation of the sleeve with the female nut when the fastening force is applied.

5,160,179

PIPE COUPLER WITH SPLIT RING CHUCK

Fumio Takagi, Aichi, Japan, assignor to CKD Corporation, Komaki, Japan

PCT No. PCT/JP90/01508, § 371 Date Jul. 19, 1991, § 102(e) Date Jul. 19, 1991, PCT Pub. No. WO91/07618, PCT Pub. Date May 30, 1991
PCT Filed Nov. 19, 1990, Ser. No. 730,883
Claims priority, application Japan, Nov. 20, 1989, 1-134741[U]; Oct. 2, 1990, 2-104378[U]
Int. Cl.[5] F16L *37/00*
U.S. Cl. 285—340 **9 Claims**



1. A pipe coupler for connecting a flexible tube to a fluid line connection port, the pipe coupler having a distal side generally facing the flexible tube and a proximal side, the pipe coupler comprising:

a main body having a mounting recess for receiving the flexible tube that opens at a distal side of the main body, the mounting recess having a longitudinally extending centerline;

a sealing ring disposed within the mounting recess;

a substantially annular split ring chuck disposed within the mounting recess, the split in the chuck forming a longitudinally extending slit that extends the entire length of the chuck, the chuck further including a substantially annular reaction member at the distal end of the chuck, the reaction member having inner and outer reaction surfaces, the outer reaction surface being tapered towards the distal side and the centerline of the mounting recess and the inner reaction surface being tapered toward the proximal side and the centerline of the mounting recess, the innermost periphery of the reaction member defining a substantially annular claw having a free diameter that is slightly less than an outer diameter of the flexible tube, the annular claw being engageable with the tube to expand the slit in the chuck when the tube is inserted into the mounting recess;

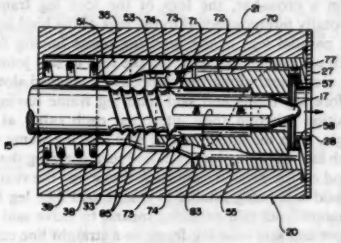
a substantially cylindrical portion at the proximal end of the chuck, the cylindrical portion being arranged to receive the distal end of the sealing ring such that the reaction member is positioned adjacent to and surrounds at least a portion of the sealing ring; and

a release ring inserted into the mounting recess at a generally distal position relative to the annular chuck, the release ring having a contact surface engageable with the inner reaction surface of the split ring chuck to release the tube from the chuck when the release ring is pressed toward the chuck.

5,160,180
AUTOMATIC QUICK OPEN/CLOSE LOCKING MECHANISM

Mitch Mlynarczyk, Chicago, Ill., assignor to Chicago Lock Company, Chicago, Ill.

Filed Oct. 18, 1991, Ser. No. 779,513
Int. Cl.[5] E05C 5/04
U.S. Cl. 292—252 19 Claims



1. The locking device for automatically locking a movable closure member relative to a stationary member such as a vending machine door and cabinet respectively, comprising;

a lock mechanism of the type provided with a lock stud having a horizontal axis mounted on the movable closure member, said lock stud having an anterior end and a posterior end, and having a lock handle secured thereto at the anterior end, and the posterior end formed into a nose portion,

said lock stud provided with a series of male threads formed in said lock stud adjacent to and along the posterior end thereof and provided with disengagable lock engaging means formed in said lock stud posteriorly of said male threads and anteriorly of said nose portion,

stud receiving locking means mounted on the stationary member,

said stud receiving locking means formed by a housing which accommodates the insertion therethrough of said lock stud, said housing including a first rotatable tubular sleeve member having an anterior end and a posterior end and having a reduced diametric interior adjacent the anterior end and an expanded diametric interior adjacent the posterior end thereof,

said posterior end having at least one cammed surface formed along the posterior surface thereof,

a tubular coupling member having an anterior end and a posterior end and seated within said first rotatable tubular sleeve member, said coupling member having a reduced diametric throat portion adjacent the anterior end thereof and a larger diametric throat portion adjacent the posterior end thereof,

said reduced diametric throat portion having at least one aperture formed therein and said larger diametric throat portion provided with disengagable lock means carried thereon,

at least one radially curved grasping element seated within the confines of said aperture in said reduced diametric throat portion of said coupling,

said coupling member seated within said first rotatable tubular sleeve member such that said reduced diametric throat portion thereof is positioned in radial alignment with said reduced diametric anterior end of said first rotatable tubular sleeve member, and said larger diametric throat portion is in radial alignment with said expanded diametric throat portion of said first rotatable tubular sleeve member when said respective members are in the rest position,

a second stationary tubular sleeve member seated adjacent said first rotatable tubular sleeve member and in horizontal alignment therewith adjacent the posterior end thereof, having an inner lip end and an upper spring seat surface,

said second stationary tubular sleeve member having at least one stationary cam surface formed along said inner lip end for cammingly engaging said cammed surface formed along the posterior end of said first rotatable tubular sleeve member,

said second stationary tubular sleeve member being stationary relative to said housing and said first rotatable tubular sleeve member being rotatable relative to said second tubular sleeve member along the cam surfaces thereof,

biasing means interposed between said first rotatable tubular sleeve member and said housing, and coupling biasing means interposed between said coupling and said upper spring seat surface of said second stationary tubular sleeve member such that said first and second tubular sleeve members are normally biasingly urged together and said coupling is normally biasingly urged away from said second tubular sleeve member,

said first rotatable sleeve member, coupling and second stationary tubular sleeve member being adapted to accommodate the insertion therethrough of said lock stud,

whereby upon insertion of said lock stud into said housing, said male threads thereof will confront said radially curved grasping element carried by said coupling and biasingly urge said coupling posteriorly until said radially curved grasping element is permitted to reciprocate upwardly through said aperture containing same when said reduced throat portion of said coupling is in registry and alignment with said expanded diametric interior of said first tubular sleeve member, and allows said radially curved grasping element to ride into one of the male threads of said lock stud such that upon release of said lock stud, said grasping element retracts once again into said aperture when entering said reduced diametric anterior of said first tubular sleeve member thereby to lock said lock stud within said housing; and the opening of the lock mechanism is accomplished by rotating said lock stud counterclockwise until said disengagable lock engaging means engage the disengagable lock means carried in the posterior end of said coupling thereby to permit rotation only in a counterclockwise direction and thereby to permit only the rotation of said first tubular sleeve member to cam anteriorly relative to said second tubular sleeve member until the radially curved grasping element rides into the expanded throat portion thereof and out of contact with said male threads of said lock stud permitting said lock stud to be fully withdrawn from said lock stud receiving mechanism and allow opening of the movable closure member relative to the stationary member.

5,160,181
PICK-UP HEAD ASSEMBLY

Mark A. Lykam, San Jose, and Minoru Akagawa, Fremont, both of Calif., assignors to Intelmatec Corporation, Fremont, Conn.

Filed Sep. 9, 1991, Ser. No. 757,064
Int. Cl.[5] B65G 47/24, 47/91
U.S. Cl. 294—64.1 5 Claims

1. A pick-up head assembly comprising:

a first vertical tube rotatably supported by a first supporting member;

a second vertical tube rotatably supported by a second supporting member;

a pinion supported by a spline shaft so as to be rotatable therewith and slidable therealong;

a pinion rotating means for causing said pinion to rotate with said spline shaft;

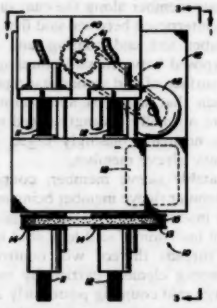
a first rack gear affixed to said first supporting member;

a second rack gear parallel to said first rack gear and affixed to said second supporting member on the same side of said pinion as said first rack gear; and

a third rack gear parallel to said first and second rack gears and affixed to said second supporting member on the opposite side of said pinion with respect to said first and second rack gears;

said pinion being slidable along said spline shaft between a first position and a second position along said spline shaft,

said pinion at said first position engaging with said first and second rack gear but not with said third gear such that rotation of said pinion causes said first and second vertical tubes to move vertically upward or downward together,



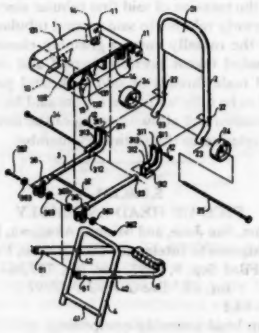
said pinion at said second position engaging with said first and third rack gears but not with said second rack gear such that rotation of said pinion causes said first and second vertical tubes to move vertically up and down in mutually opposite directions.

5,160,182

MULTI-FUNCTION CHAIR

Chien I. Chang, No. 38, Bao-Chung 3rd St., Chia-Yi City, Taiwan

Filed Jan. 16, 1992, Ser. No. 821,442
Int. Cl.[5] A47C *13/00*
U.S. Cl. 297—129 **3 Claims**



1. A multi-function chair comprising:

a seat having laterally spaced downwardly projecting walls defining small upper openings and lower large openings communicating with the upper openings, and laterally spaced downwardly projecting engaging means behind said walls;

a back frame which is U-shaped, having parallel legs extending downward from a joining cross member and shaft holes below the longitudinal center for rivets to pass through to secure said seat with the back frame and said legs having free ends beneath the seat provided with casters;

a seat frame supporting the seat having two parallel rods and a lateral rod secured between the parallel rods near a front end of the seat, an L-shaped bracket fixed at the rear end of each of said parallel rods, said brackets having upper vertical limbs connected to the respective legs of the back frame and lower horizontal limbs connected with the seat frame, a joint fitting fixed to a front end of each of said parallel rods and having an L-shaped slot with a horizontal portion and a vertical portion extending downwardly from the respective rod;

a U-shaped fore leg frame having parallel legs extending from a cross bar and a lateral connecting rod between lower end portions of the legs, the cross bar being adapted to engage the engaging means under the seat;

a U-shaped hind leg frame having parallel legs extending from a cross-bar, the legs of the fore leg frame being pivotally interconnected to the legs of the hind leg frame, the parallel legs of the hind leg frame having free ends with pin connectors securing the legs to said joint fittings for movement along the respective L-shaped slots; and

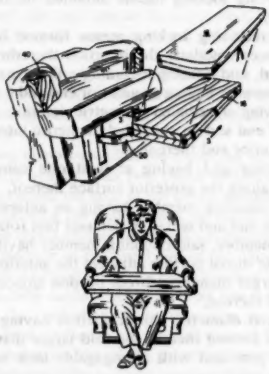
said fore leg frame and said hind leg frame having a first position wherein they intercross each other at a right angle, with the lateral rod of said fore leg frame engaged with said engaging means in said seat, enabling the chair to stand on the ground, said back frame and the rear portion of said seat being liftable to enable said fore leg frame to separate from said engaging means, to move said fore leg frame and said hind leg frame to a straight line configuration whereby, both of said leg frames can be rotated to the front of said seat to engage the lateral rod of said fore leg frame in the lower openings in said walls on said seat, converting the chair into a light duty truck.

5,160,183

COMBINATION TABLE AND LEG REST FOR RECLINING CHAIR

Michael F. Rusyniak, 9 Donald Pl., Liverpool, N.Y. 13090

Filed Mar. 13, 1992, Ser. No. 850,924
Int. Cl.[5] A47C *7/52, 7/68*
U.S. Cl. 297—153 **14 Claims**



1. In a reclining chair having a leg rest movable from a substantially vertical stored position to a substantially horizontal supporting position, a combination leg rest table which comprises:

a generally rectangular base member mounted on extendable chair frame members for movement from a vertical storage position to a horizontal supporting position;

a flat generally rectangular table member detachably mounted on said base member;

a pair of retractable/extendable mounting supports fixed to one side of said table member; and

a pair of receptacles fixed in a reclining chair, said receptacles being sized and spaced apart so as to receive therein said retractable/extendable mounting supports when in the extended position;

so that said table member may be selectively removed from said base member and mounted in said receptacles to form

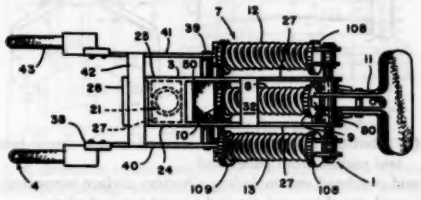
a generally horizontal table surface across the front of a reclining chair.

5,160,184

CONTROLLER FOR SEATING AND THE LIKE

Frederick S. Faiks, Greenville; Craig M. Anderson, Kentwood, and Daniel R. Bischoff, Grand Rapids, all of Mich., assignors to Steelcase, Inc., Grand Rapids, Mich.

Continuation of Ser. No. 380,782, Jul. 18, 1989, Pat. No. 5,026,117. This application Mar. 6, 1991, Ser. No. 665,318
The portion of the term of this patent subsequent to Jun. 25, 2008, has been disclaimed.
Int. Cl.[5] A47C *3/00*
U.S. Cl. 297—304 12 Claims



1. In a chair of the type having a support and a back which tilts about an axis with respect to said support, the improvement of a shared-load, back tension controller, comprising:

a first spring having a first end thereof operably connected with said support, and a second end thereof operably connected with said back at a location offset from said tilt axis, whereby rearward tilting of said back deflects said first spring, thereby generating a first torque which resists those forces that tilt said back rearwardly; said first spring being pretensed to create a minimum amount of said first torque which biases said back into a normally, fully upright position;

a second spring having a first end thereof operably connected with said support, and a second end thereof operably connected with said back at a location offset from said tilt axis, whereby at least selected rearward tilting of said back deflects said second spring, thereby generating a second torque which resists those forces that tilt said back rearwardly; said second spring including means for varying the amount of said second torque independently of said first torque, whereby said first and second springs combine to share the load applied to said back during tilting, with said first spring providing a minimum base torque, and said second spring providing a variable additional torque to adapt said chair for different users and various applications.

5,160,185

INFANT SUPPORT AND RESTRAINT SYSTEM

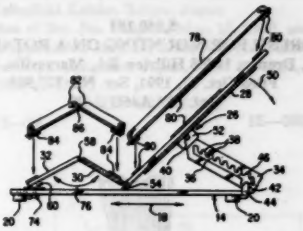
Howard J. Stang, 5222 Lakeview Ct., White Bear Lake, Minn. 55110

Filed Mar. 12, 1991, Ser. No. 668,222
Int. Cl.[5] A61G *13/00*
U.S. Cl. 297—377 17 Claims

1. An infant support and restraint system comprising:

(a) a substantially planar, longitudinally extending base platform for contiguous interface with a base surface;

(b) means for adjustably supporting said infant on said base platform in a plurality of infant support positions, said means for adjustably supporting said infant including (1) a first substantially planar member having one end rotatably secured to said base platform by a first pivotal connection, (2) a second substantially planar member having a first end rotatably secured to said first substantially planar member and said base platform by said first pivotal connection, and (3) a third substantially planar member having a first end pivotally coupled to a second end of said second substantially planar member and a second end rotatably coupled to said base platform by a second pivotal connection, said second pivotal connection being releasably securable to said base platform at predetermined longitudinally displaced positional locations on said base platform; and,



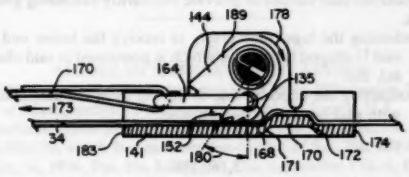
(c) means for releasably constraining said infant to said adjustable support means, said means for releasably constraining including a pair of leg constraint strap members, each of said pair of leg strap members encircling a portion of a leg of said infant and being releasably secured to said second and third substantially planar members on opposing ends of said leg strap members.

5,160,186

LOW PROFILE WEB ADJUSTER

David J. Lee, Carmel, Ind., assignor to Indiana Mills and Manufacturing Inc., Westfield, Ind.

Continuation-in-part of Ser. No. 499,946, Mar. 27, 1990, Pat. No. 5,031,962. This application Dec. 28, 1990, Ser. No. 635,715
The portion of the term of this patent subsequent to Jul. 16, 2008, has been disclaimed.
Int. Cl.[5] A47D *15/00*
U.S. Cl. 297—479 10 Claims



1. A low profile web adjuster comprising:

a frame including a base wall with a rib formed on said base and projecting outwardly therefrom, said frame further including a pair of upstanding walls extending from said base wall with said rib extending between said upstanding wall;

a mounting device mounted to and extending between said upstanding walls, said mounting device spaced apart from said base wall;

a cam member having a pivot axis and pivotally mounted by said mounting device to said upstanding walls on said pivot axis, said cam member including a web engageable friction surface movable toward said base wall and said rib to hold a web therebetween, said rib positioned between said base wall and said pivot axis;

spring means engaged with said cam member normally forcing said friction surface to a web engageable position under normal loading to hold a web between said cam member and said base wall but yieldable to allow said cam member to pivot moving said friction surface away from said web engageable position to a release position allowing said web to move relative to said frame and said cam member, said spring means further operable to allow said

cam member under abnormal high loading to further pivot moving said friction surface adjacent said rib to hold said web between said cam member and said rib;

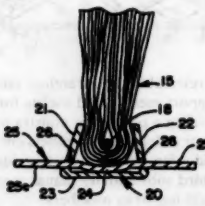
control means associated with said cam member to move said cam member and said friction surface from said web allowing said web to be be moved relative to said frame.

5,160,187

STRIP BRUSH FOR MOUNTING ON A ROTARY DRUM

Arthur E. Drumm, 14808 Hillview Rd., Marysville, Ohio 43040

Filed Oct. 17, 1991, Ser. No. 777,905
Int. Cl.[5] A46D *3/00*
U.S. Cl. 300—21 16 Claims



1. A method of producing a bristle strip which comprises providing an elongated formable flat strip and forming therein longitudinally spaced pairs of laterally-opposed slots with the slots being arranged in rows adjacent each edge o the strip and located a predetermined distance from each edge, forming the strip into a channel of U-form with upstanding side flanges and a bottom, said distance being such that when the strip is formed the slots will be just above said bottom as determined by said predetermined distance and securing a mat of U-shaped bristles having a closed end and an open end, the closed end being enclosed in said channel, passing lugs through said slots for engagement with the exterior surface of said closed end of said bristle mat and with the ends of said lugs projecting outwardly beyond the side flanges to provide outwardly extending guide ears,

indenting the lugs transversely to receive the lower end of said U-shaped bristle mat which is positioned in said channel, and

contacting the opposite side of the lug from the indentation with said bottom of said channel.

5,160,188

FURNITURE STANCHIONS WITH UNITARY POWER ROUTING SYSTEM

A. Brooks Rorke, Fairfield, Conn.; Wallace C. Bullwinkle, Norristown; William I. Stephens, Barto, both of Pa.; Robert E. Reuter, East Setauket, N.Y., and John J. Rizzi, Weston, Conn., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 12, 1990, Ser. No. 536,873
Int. Cl.[5] A47B *17/00*
U.S. Cl. 312—196 6 Claims

1. A furniture system including a base unit and an overhead unit and at least one stanchion, said base unit including:

(a) stanchion securement means for fastening said stanchion to said base unit, said stanchion securement means including plural holes therethrough;

(b) a work surface secured to said stanchion securement means;

said stanchion including:

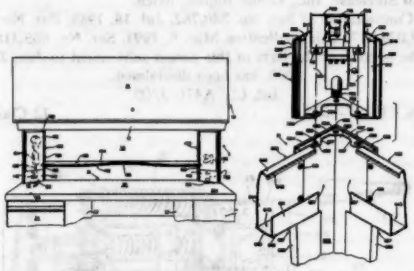
(c) a unitary right-angle frame including two longitudinal side edges, a top edge, and a bottom edge;

(d) a top end plate secured to said frame;

(e) a unitary right-angle bottom end plate secured to said frame, said bottom end plate further including a cable clearance space disposed in said bottom plate and plural securement holes in said bottom end plate in alignment with said holes in said stanchion securement means;

(f) a top front panel having side edge secured to said frame, and having a top edge secured to said top end plate;

(g) a middle front panel secured to said frame below said top front panel;



(h) a bottom accessory panel secured to said frame below said middle front panel; and

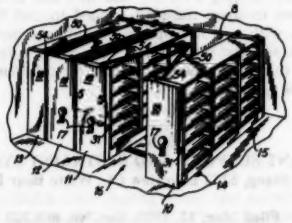
said overhead unit including a bottom surface supported by said stanchion and secured to said top end plate.

5,160,189

AUTOMATIC LOCKING DEVICE FOR MOVABLE SHELVING

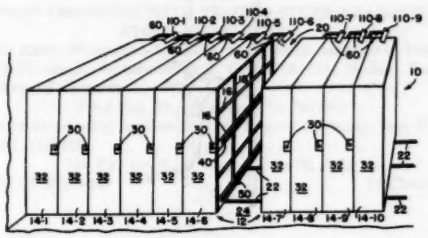
Daniel J. Johnston, Porterfield, and Russell Cleven, Marinette, both of Wis., assignors to Automated Storage & Retrieval Systems of America, New York, N.Y.

Filed Apr. 3, 1990, Ser. No. 505,248
Int. Cl.[5] A47B *53/00*
U.S. Cl. 312—201 18 Claims



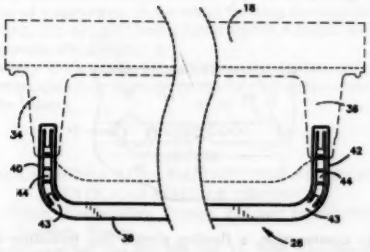
1. A movable shelving system comprising a plurality of sections, driving means for moving at least one section relative to an adjacent section over a path a maximum distance in first and second opposite directions, said maximum distance being substantially greater than a minimum spacing required between said one section and said adjacent section to allow a user to access said one section, locking means responsive to movement of said one section in the first direction over a predetermined distance less than said minimum spacing for automatically locking said one section against movement in the second direction and yet allowing continued movement of said one section in the first direction up to the maximum distance and means for resetting said locking means to release said locking means and allow said one section to be moved in the second direction.

5,160,190
MOVABLE STORAGE SYSTEM WITH AISLE MONITORING APPARATUS
Richard B. Farrell, New York, N.Y., and David P. Orlowski, Clinton, Mich., assignors to Automated Storage & Retrieval Systems of America Inc., New York, N.Y.
Filed May 20, 1991, Ser. No. 703,188
Int. Cl.[5] A47B *88/00*
U.S. Cl. 312—201 23 Claims



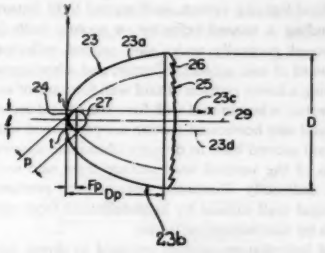
1. A detection system coupled in a storage system having a plurality of storage elements at least one of which is movable to open and close an access aisle adjacent at least one of the storage elements, said detection system comprising:
means for detecting the movement of a person within an open aisle without direct contact between said detection system and the person.
means responsive to said movement detecting means for causing said storage system to prevent an open aisle in which said movement detecting means detects movement of a person from being closed by movement of a storage element adjacent that open aisle.

5,160,191
ADJUSTABLE REFRIGERATOR DOOR SHELF RETAINER
James R. Holland, Gowen, and Charles J. Hoffman, Kentwood, both of Mich., assignors to White Consolidated Industries, Inc., Cleveland, Ohio
Filed Oct. 18, 1991, Ser. No. 780,709
Int. Cl.[5] A47B *81/00*
U.S. Cl. 312—405.1 13 Claims



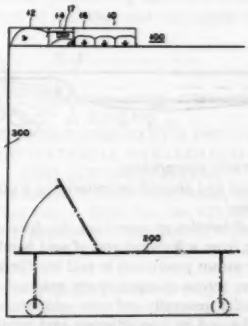
1. A horizontally adjustable retainer for a refrigerator door shelf, comprising: an elongated vertical front wall portion; two vertical sidewall portions of substantially equal length which extend, substantially at right angles and in the same direction, from the front wall portion, with each of the sidewall portions having opposed top and bottom edges; a resilient depressible release projecting from one of said edges of each sidewall portion, the outer surface of each release having a plurality of spaced recesses; and a plurality of spaced notches in the other of said edges with one notch and an associated recess at each sidewall portion cooperating to engage the top and bottom edges of an aperture in a refrigerator door liner, thereby rigidly fixing the retainer to the refrigerator door liner at one of a plurality of predetermined positions.

5,160,192
ILLUMINATING INSTRUMENT
Saburo Sugawara, Yachiyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 323,882, Mar. 15, 1989, abandoned. This application May 14, 1991, Ser. No. 701,579
Claims priority, application Japan, Mar. 16, 1988, 63-63812; Mar. 16, 1988, 63-63813
Int. Cl.[5] G03B *15/02*
U.S. Cl. 362—16 23 Claims



1. An illuminating instrument comprising:
a reflector composed of a combination of at least a part of two elliptic reflecting surfaces, each of said two elliptic reflecting surfaces being separated from each other by a predetermined interval perpendicular to the illuminating optical system optic axis;
a light source arranged to be located on the illuminating optical system optic axis, said light source being located near a focal point of each of said elliptic reflecting surfaces; and
a condenser arranged at an opening of said reflector.

5,160,193
MODULAR MEDICAL LIGHT SYSTEM
William C. Fabbri, Billerica, and Roy Crane, Wilmington, both of Mass., assignors to Keene Corporation, Union, N.J.
Continuation-in-part of Ser. No. 693,696, Apr. 30, 1991, Pat. No. 5,086,375, which is a continuation-in-part of Ser. No. 629,436, Dec. 18, 1990, Pat. No. 5,038,254. This application Feb. 4, 1992, Ser. No. 830,801
Int. Cl.[5] F21V *13/00*
U.S. Cl. 362—33 35 Claims



1. A medical lighting system comprising:

a first light fixture module oriented to direct light downwardly to a selected reading area under the medical lighting system, said first light fixture including a first reflector with an inclined axis, a first bulb generally under said first reflector, a forward wall blocking at least a portion of light reflected from said first bulb by said first reflector, and a first shield under said first bulb aligned with said first reflector and with a lower section of said forward wall to prevent non-reflected light from emanating directly from said first bulb outwardly from said first light fixture module;

a second light fixture module oriented to direct light downwardly and outwardly to a vertical wall surface outwardly adjacent from the medical lighting system whereby light is reflected back to a broad area under the medical lighting system, said second light fixture module including a second reflector, a second bulb forwardly disposed generally under said second reflector, a wall forward of said second reflector, and a horizontal section joining a lower portion of said wall forward of said second reflector, wherein said wall forward of said second reflector and said horizontal section are positioned with respect to said second bulb to directly illuminate uppermost portions of the vertical wall surface from said second bulb and indirectly illuminate intermediate portions of the vertical wall surface by light reflected from said second bulb by said second reflector;

a third light fixture module oriented to direct light downwardly under the medical lighting system to a selected patient examination area under the medical lighting system, said third light fixture module including at least one optical system, each of said optical systems including a third reflector including two substantially ellipsoidal contours forming an apex therebetween, a third bulb directly below said apex, vertical risers at outermost edges of said optical system intersecting with outermost edges of said contours, and a second shield under said third bulb aligned with lower ends of said vertical risers to prevent non-reflected light to emanate directly from said third bulb outwardly from said third light fixture module; and

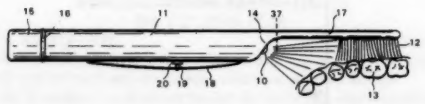
a fourth light fixture module including reflection means oriented to direct light to a selected side of the bed substantially free from directing light onto the bed.

5,160,194

TOOTHBRUSH WITH EXTERNALLY ILLUMINATED BRISTLES

Melvin D. Feldman, 1745 Sequoia Ave., Burlingame, Calif. 94010

Filed Feb. 27, 1992, Ser. No. 842,617
Int. Cl.[5] A46B *9/04*
U.S. Cl. 362—109 **20 Claims**



1. A toothbrush, comprising:

a handle sized and shaped for providing a comfortable and secure grip,

a plurality of bristles mounted on the distal end of a head extending from a forward end of said handle,

light source means positioned in said handle for projecting a light beam across an open space external of said handle and said head generally and onto said bristles to illuminate said bristles and an area adjacent said bristles,

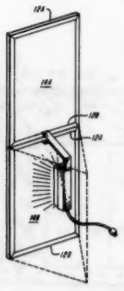
power supply means for energizing said light source means.

5,160,195

DISPLAY PANEL BACKLIGHTING SYSTEM

Eric A. Miller, Allston, Mass., assignor to TigerMark, Allston, Mass.

Filed Jan. 31, 1992, Ser. No. 828,741
Int. Cl.[5] F21V *7/00*
U.S. Cl. 362—300 **13 Claims**



1. In a display system including a peripheral frame surrounding a translucent panel having front and back surfaces, the improvement comprising an apparatus for lighting the panel from the back surface comprising,

a light source,

a support arm hingedly connected to the light source, and including securing means for releasably securing the support arm to the peripheral frame,

the support arm being arranged in relation to the light source so that the light source is disposed at a distance from the back surface of the panel for radiating light through the panel to evenly illuminate the front surface when the support arm is secured to the peripheral frame, and

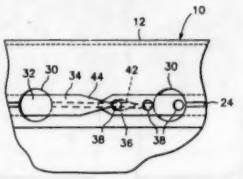
the support arm being foldable against the light source to provide a compact structure for storage and transportation when the backlighting apparatus is not in use.

5,160,196

TRASH BAG WITH MOUTH STIFFENER INSERT

Joseph Curtis, 421 15th Ave., North, Surfside Beach, S.C. 29577

Filed Feb. 15, 1991, Ser. No. 655,851
Int. Cl.[5] B65D *33/28, 33/30*
U.S. Cl. 383—33 **11 Claims**



1. In combination, a flexible plastic bag including a first closed end and a second open end, said bag, at said second end, defining a terminal end band extending about said second end and a peripheral band extending thereabout closely spaced from said terminal end band toward said closed end, said open end including a reversely turned portion intermediate said bands with the latter disposed in registered superposed relation, said bands being bonded together along a path disposed intermediate the free edge of said terminal end band and said reversely turned portion to define a tubular hem extending about said open end intermediate said path and said reversely turned portion, said bands having pairs of registered openings formed therein spaced about said open end, an elongated, stiff,

but flexive reinforcing strip including joining means at its opposite ends releasably securing said ends together against longitudinal shifting relative to each other, said strip being lengthwise threaded through adjacent pairs of registered openings, said strip, when threaded through said registered openings and having said opposite ends secured together serving to reinforce said one end of said bag against collapse, said strip being generally arcuate in transverse cross section with its major radius of curvature side thereof disposed outermost.

5,160,197

SNAP COUPLING WITH TEMPERATURE READOUT FOR HAND SHOWER

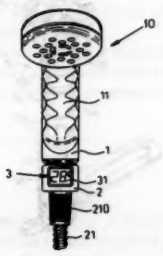
Odo Klose, Wuppertal, Fed. Rep. of Germany, assignor to Friedrich Grohe Armaturenfabrik GmbH & Co., Hemer, Fed. Rep. of Germany

Filed Sep. 16, 1991, Ser. No. 760,863

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1990, 4029419

Int. Cl.[5] G01K *13/02, 1/14;* **A47K** *3/22*

U.S. Cl. 374—147 **11 Claims**



1. In combination with

a hand shower having an upstream end; and

a hose having a downstream end adapted to be connected to the shower upstream end to feed water to same; a fitting comprising:

a snap coupling including

a male part fixed on one of the ends;

a female part fixed on the other of the ends and fittable over the male part; and

latch means in the female part for releasably retaining the male part therein;

means including a display on one of parts for giving a readout of a parameter of the water flowing through the coupling, the one part being formed with a recess on a side opposite the display;

a battery in the recess for powering the display; and

a watertight cover over the recess for closing the recess over the battery.

5,160,198

MODULAR STRUCTURE CABINET FOR STIRRERS OF PAINTS AND SIMILAR PRODUCTS

Roger Fillon, Rambouillet, France, assignor to Fillon-Pichon S.A., Yvelines, France

Continuation of Ser. No. 552,899, Jul. 16, 1990, abandoned. This application Nov. 21, 1991, Ser. No. 798,367

Claims priority, application France, Jul. 18, 1989, 89 09640

Int. Cl.[5] B01F *7/20*

U.S. Cl. 366—198 **14 Claims**

1. A cabinet system for storing and stirring of products packaged in cans having a can stirrer comprising:

two contiguous modules, each of said modules including

a vertically short, flat base having a flat top surface,

a first discrete modular cell mounted on said base and at least two discrete superimposed modular cells mounted on said first cell,

each of said discrete modular cells having a generally rectangular parallelepiped configuration with an open front and an open bottom, and including

(a) two vertical side panels,

(b) a top plate enclosure connecting upper portions of said vertical panels and having a flat top surface,

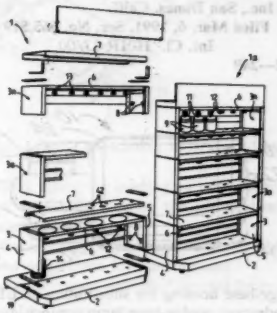
(c) can coupling members depending from said top plate enclosure which are respectively and complementarily connected to a respective can stirrer of a respective can resting on a lower adjacent said top surface, and

(d) respective driving mechanisms to which respective said can coupling members are connected and which are contained in said top plate enclosure for driving said can coupling members,

said first cell having

(a) respective assembly means for attaching respective said vertical panels of said first cell to said base, and

(b) a vertical transmitting unit extending from said top plate enclosure toward said base,



each of said superimposed cells having

(a) respective assembly means for attaching respective said vertical panels of said superimposed cells to a lower and adjacent said cell, and

(b) a vertical transmitting unit extending from said top plate enclosure which is adapted to connect with said vertical transmitting unit of a lower said top plate enclosure;

a single motor reducing unit provided adjacent only one of said cells of only one of said modules, and connected to said vertical transmitting unit of said one of said cells of said one of said modules; and

a horizontal transmitting unit in said one of said modules connected to said motor reducing unit for transmitting movement of said motor reducing unit horizontally to one of said vertical transmitting units of a horizontally adjacent said cell of the other said contiguous module.

5,160,199

HALOGEN LAMP REFLECTOR INCLUDING A CERAMIC MATERIAL PARABOLOID LIGHT REFLECTING ELEMENT

Franco Berti, via Isonzo, 9, 20090 Buccinasco, Milan, Italy

Filed Dec. 3, 1990, Ser. No. 621,269

Claims priority, application Italy, Dec. 6, 1989, 22610 A/89

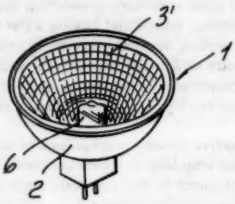
Int. Cl.[5] F21V *7/22*

U.S. Cl. 362—346 **1 Claim**

1. A halogen lamp projector, comprising a reflector of ceramic material which is:

paraboloid in shape having a mirror-like inner surface coated with gold oxides through a metalizing process, and

a two-pin socket coaxially secured to said paraboloid reflector by means of a cementing substance, said two-pin



socket provides on electrical connection for a halogen lamp.

5,160,200

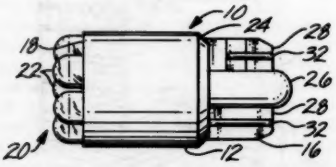
WEDGE-BASE LED BULB HOUSING

David A. Cheselske, Upland, Calif., assignor to R & D Molded Products, Inc., San Dimas, Calif.

Filed Mar. 6, 1991, Ser. No. 665,519

Int. Cl.[5] H01R *33/00*

U.S. Cl. 362—249 **9 Claims**



1. A wedge-base housing for substituting an LED structure for an incandescent wedge-base lamp comprising:

a hollow plastic body extending along a central axis between a closed end and an opposite open end, the open end being adapted to receive and retain an LED structure;

a plastic base integral with the hollow plastic body and extending outward axially from the hollow plastic body closed end, the plastic base having a central axial leg and two arms extending radially in opposite directions from the central axial leg, each arm having an axial end remote from the hollow plastic body; and

a bore through the hollow plastic body closed end proximate each arm for allowing electrical leads extending from the LED structure to pass through the hollow plastic body closed end for electrical connection outside the hollow plastic body, wherein the wedge-base housing further comprises a groove in each arm extending axially from a location proximate the bore and around the axial end of each arm for receiving an LED electrical lead.

5,160,201

ROTATABLE LED CLUSTER DEVICE

Avi Wrobel, Santa Monica, Calif., assignor to Display Products, Incorporated, El Segundo, Calif.

Filed Jul. 22, 1991, Ser. No. 733,333

Int. Cl.[5] F21V *21/00*

U.S. Cl. 362—249 **5 Claims**

1. A panel illuminating display module comprising:

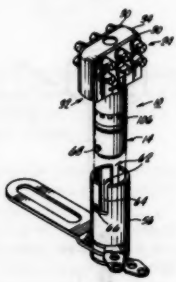
(a) structural support means for affixing a plurality of light-emitting electrical units relative to one another, the light-emitting electrical units being electrically interconnected to form an array having a first electrical pole and a second electrical pole;

(b) a cylindrical base connector having a longitudinal axis, a first electrical pole and a second electrical pole, the base connector being adapted for reception within, and electrical connection to, a female connector socket having a pair of oppositely charged electrical poles, the cylindrical base connector further comprising a first cylindrical chamber having a diameter slightly larger than the diameter of the shaft;

(c) means for electrically connecting the first and second electrical poles of the array to the first and second electrical poles of the electrically conductive cylindrical base connector, respectively;

(d) means for rotatably affixing the array to the conductive base connector, comprising a shaft having a cylindrical body and a cylindrical head disposed on one end of the body, the diameter of the shaft head being greater than the diameter of the shaft body, the portion of the shaft body distal to the shaft head being affixed within the first cylindrical chamber along the longitudinal axis of the cylindrical base connector and the shaft head being rotatably affixed to the structural support means; and

(e) means for restricting the rotation of the array relative to the cylindrical base connector;



Wherein:

the shaft head is cylindrical and has a diameter greater than the diameter of the shaft body;

the shaft and the portion of the shaft body proximate to the shaft head are disposed within a second cylindrical chamber which is defined within the support structure;

the portion of the shaft body disposed within the structural support but not within the second chamber is disposed within a third chamber which is defined within the structural support, the third chamber having a diameter which is smaller than the diameter of the second chamber;

the second and the third chambers intersect and, at the point of intersection, form a lip; and

a compression spring having an external diameter larger than the diameter of the third chamber is disposed around the shaft body within the second chamber, the spring impinging at its one end against the shaft head and at its other end against the lip formed by the intersection of the second and third chambers.

5,160,202

ILLUMINATED CONCRETE CURBSTONE

Luc R. Légaré, 4220, Parnier, Pierrefonds, Quebec, Canada H9K 1K8

Filed Jan. 9, 1992, Ser. No. 818,336

Int. Cl.[5] E01F *9/00*

U.S. Cl. 362—153.1 **7 Claims**

1. An illuminated concrete curbstone block for driveway curbing adapted to be partly immersed in the ground adjacent a driveway, said block comprising

a prismatic concrete block having a top face, a rear face, a front face and two lateral faces, a portion of said rear, front and lateral faces adapted to emerge above the ground,

a housing located inside said block adjacent said top face, said housing forming a transparent rigid window substan-

tially aligned with said front face, said window adapted to lie at a level above the ground,

a lighting means in said housing and a reflector for projecting the light from said lighting means through said window, said means having electric wires for electrically feeding said lighting means,

an open channel downwardly extending from said housing to said rear face for allowing said wires to freely pass therethrough and for letting said wires extend outside said block at a level above the ground and for allowing air circulation therethrough,

whereby said illuminated curbstone block is adapted to project light onto said driveway at the level above the ground and said channel is adapted to allow air penetration into said housing.

5,160,203

MIRROR SUPPORT FOR A SUN VISOR FOR AUTOMOTIVE VEHICLES

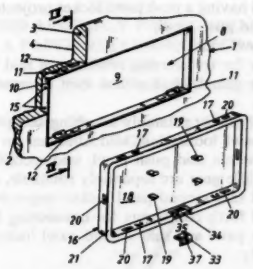
Lothar Viertel, Altforweiler, Fed. Rep. of Germany, and Patrick Welter, La Chambre, France, assignors to Gebr. Happich GmbH, Fed. Rep. of Germany

Filed Jun. 27, 1991, Ser. No. 721,963

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1990, 4023243

Int. Cl.[5] F21V *33/00*

U.S. Cl. 362—141 **20 Claims**



1. A sun visor for an automotive vehicle comprising:

a sun visor body having at least one generally flat external surface and comprised of foam material, the one surface being shaped to define a recess therein having sidewalls and having an open side on the one surface;

a frame in and extending around the recess sidewalls;

a trough in the frame for receiving a mirror and a mirror in the trough, the frame and the trough each having cooperating means for clipping the trough to the frame;

claws on the frame which are shaped and positioned for being moved to be anchored in the foam material of the recess sidewalls, to thereby anchor the frame in the foam material of the visor body with the trough in the frame.

5,160,204

RIBBON ADAPTER AND RIBBON CASSETTE CAPABLE OF MOUNTING THE RIBBON ADAPTER AND RECORDING APPARATUS

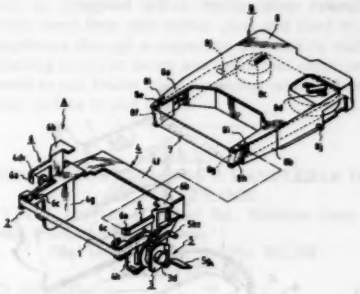
Hisatsugu Naito, and Shinya Asano, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 22, 1991, Ser. No. 688,282

Claims priority, application Japan, Apr. 24, 1990, 2-106626; Apr. 24, 1990, 2-106627; Apr. 24, 1990, 2-106628

Int. Cl.[5] B41J *35/28*

U.S. Cl. 400—208 **23 Claims**



1. A ribbon adaptor attachable to a recording apparatus, comprising:

ribbon loading means for loading an ink ribbon;

ribbon feed means for feeding the ribbon loaded by said ribbon loading means;

a support frame member for supporting said ribbon loading means and said ribbon feed means: and

adaptor stopping means provided on said frame member.

5,160,205

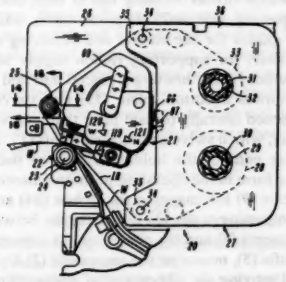
THERMAL PRINTER WITH ADJUSTABLE INK RIBBON GUIDE ROLL

John D. Mistyurik, Troy, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Jun. 17, 1991, Ser. No. 716,172

Int. Cl.[5] B41J *33/32*

U.S. Cl. 400—248 **9 Claims**



1. A thermal printer, comprising: a frame, a thermal print head and a cooperable platen mounted to the frame, a guide for an ink ribbon, the ink ribbon being guided from a supply roll, to between the print head and the platen, partially about the guide and to a take-up roll, the guide extending generally in a lateral orientation across and in guiding contact with the ink ribbon, and means for changing the inclination of the guide along a generally straight planar path while maintaining the guide in its lateral orientation to provide substantially uniform tension across the web.

5,160,206

HOLDER OF A RIBBON WITH SUPPLY AND TAKE-UP SPOOLS FOR TYPEWRITERS OR SIMILAR MACHINES

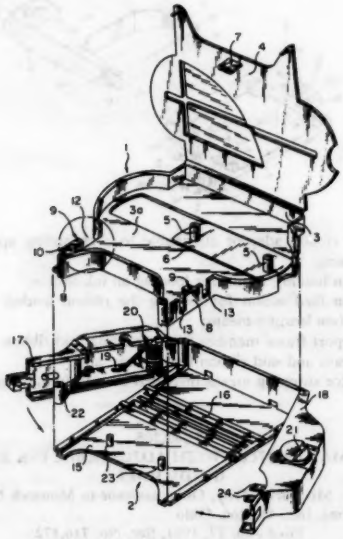
Johannes Haftmann, Schwabach, and Werner Haczek, Furth, both of Fed. Rep. of Germany, assignors to Ta Triumph-Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Continuation of Ser. No. 280,484, Dec. 6, 1988, abandoned. This application Jul. 23, 1990, Ser. No. 559,539

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1987, 3741362

Int. Cl.[5] B41J *35/28*

U.S. Cl. 400—250 5 Claims



1. A holder housing for a ribbon with supply and take-up spools for typewriters or similar machines, a ribbon and a receptacle: which holder housing has at least one flat plate with encompassing side walls disposed on it; which holder housing has guides for the ribbon and receiving shafts, disposed on a slide, for supporting ribbon supply and take-up spools; and which holder housing is placed into said receptacle (2) that comprises a bottom plate (15) and swivelable side elements disposed laterally on said plate that can be swivelled out of the way, which swivelable side elements (17, 18) encompass the outer ends of the holder housing of the ribbon in clamshell-like form in the operating position wherein retention means elements (9) for engaging the ribbon (14) are disposed on the encompassing walls (3) in the region between ribbon guidance elements (8) and the ribbon spools supported on the receiving shafts (5), means on the receptacle (2) for exerting a force on and moving the ribbon out of engagement with the retention means elements (9);

and wherein a ribbon tensioning element (22) for exerting a force on and moving said ribbon, is disposed on one of the swivelable side elements (17), and when the holder housing (1) is placed into the receptacle (2) and when the one of the swivelable side elements (17) is swivelled into position, the ribbon tensioning element reaches through an opening (12) in the wall (3) of the holder (1) directly beside one of the retention means elements (9) and disengages the ribbon from said one of the retention elements.

5,160,207

MECHANISM FOR CORRECTING THE PRINTING POSITION OF AN ELECTRONIC TYPEWRITER

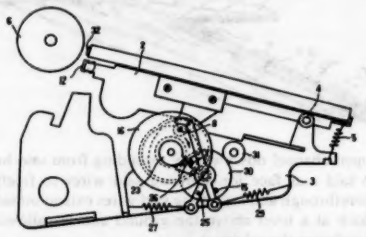
Haeng-Cho Woo, Sungnam, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Oct. 31, 1990, Ser. No. 606,757

Claims priority, application Rep. of Korea, Jan. 5, 1990, 1990-42

Int. Cl.[5] B41J *33/14, 35/27, 29/36*

U.S. Cl. 400—697.1 3 Claims



1. A mechanism for correcting the printing position of an electronic typewriter, comprising:

a carriage body,

a ribbon bracket;

a pivot pin for pivotally mounting said carriage body and said ribbon bracket to each other by means of a first coil spring;

a ribbon cam for lifting and lowering a ribbon, said ribbon cam having a printing track groove and a correction track groove formed on one side of said ribbon cam and connected to each other to form a correction angle with two respective slopes between starting points of said printing track groove and said correction track groove, said ribbon cam further having a following gear and a push cam fixedly attached to said one side of said ribbon cam;

a motor for rotating said ribbon cam;

a cam guide having a working pin resiliently supported by a second coil spring, for connecting to said ribbon bracket, said working pin cooperating with said ribbon cam for moving said ribbon bracket to a printing position and a correction position;

a push pawl having a push pawl locker projected at an upper end of said push pawl;

a second pawl locker;

an idle gear for transferring rotations of said motor to said following gear of said ribbon cam to rotate said ribbon cam; and

a gear pivot pin for rotatably attaching said push pawl, said second pawl locker and said idle gear to said carriage body, wherein said push pawl, said second pawl locker and said idle gear are separately rotatable, and said push pawl and said second pawl locker respectively having a third and forth coil spring for connecting lower ends of said push pawl and said second pawl locker to said carriage body.

5,160,208

LOOSE LEAF BINDER REVISION DEVICE AND METHOD OF USING SAME

John E. Lockhart, Plainfield, Ill., assignor to Revision Qix, Ltd., Chicago, Ill.

Filed Sep. 19, 1990, Ser. No. 585,302

Int. Cl.[5] B42F *13/00*

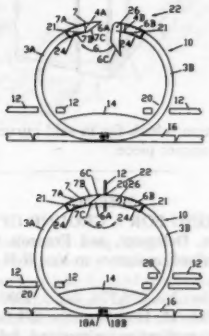
U.S. Cl. 402—24 27 Claims

1. An apparatus for facilitating the quick revision of a bound set of ordered loose leaf elements releasably held together by a binding loop extending through mounting holes of the loose leaf elements adjacent edges thereof and having a pair of mating loop members movable between a closed position in which

they are directly engaged with each other to close the binding loop with adjacent edges of the loose leaf elements held together at an interior of the loop and an open position in which ends of the mating loop members are spaced from each other to enable removal of the edges of the loose leaf elements from the interior of the loop, comprising:

a bridge for spanning the ends of the mating loop members when they are in said open position including a movable bridge section; and

means for mounting the movable bridge section to an end of one of said pair of mating loop members for pivotal movement relative thereto between



an open positioning which the bridge extends from the end of the one mating loop member away from the end of the other mating loop member and the ends of the mating loop members are not substantially spanned by the bridge to enable sliding removal of the loose leaf elements from off the end of the other one of said mating loop elements, and

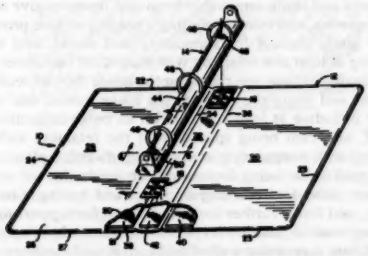
a closed position in which the ends of the mating loop members are substantially spanned by the bridge to enable sliding movement of the loose leaf elements from the end of the one mating loop member, across the bridge and onto the other one of said mating loop members.

5,160,209

FASTENER ASSEMBLY FOR CONCEALABLY FASTENING A PAPER RETAINING MECHANISM TO A BINDER

Robert F. Schuessler, 2412 Inverness Cliffs, Birmingham, Ala. 35242

Filed Aug. 20, 1990, Ser. No. 569,659
Int. Cl.[5] B42F *13/00*
U.S. Cl. 402—75 **10 Claims**



1. A concealed fastener assembly for fastening apertured paper retaining means to an inner surface of a binder having inner and outer surfaces, said fastener assembly comprising:

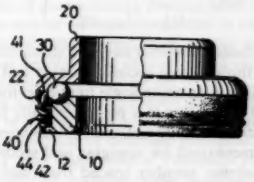
a pair of fasteners attached to an inner surface of said binder such that said pair of fasteners are concealed from an outer surface of said binder, each fastener comprising a planar anchor plate having first and second major surfaces, one of said major surfaces being fastened to said inner surface of said binder such that no portion thereof is visible to an outer surface of said binder, and post means secured against movement relative to said anchor plate, said post means being formed from two generally semi-circular tabs connected to and bent generally perpendicularly to the anchor plate such that said tabs are in an adjoining relation with each other and extend in a direction normal to the major surfaces of said plate to provide said post means with an elongated hollow configuration extending directly away from said anchor plate and sized to extend lengthwise through a respective aperture in said paper retaining means to locate and fasten said paper retaining means to said binder while remaining concealed from the outer surface of said binder.

5,160,210

COUPLING FOR SECURING A HANDLEBAR TO A BICYCLE FRAME

Chen Y. Chi, No. 139–5, Anmei Rd., Meishan Tsun, Houli Hsiang, Taichung Hsien, Taiwan

Filed Oct. 24, 1991, Ser. No. 782,378
Int. Cl.[5] F16B *1/00*
U.S. Cl. 403—24 **1 Claim**



1. A coupling for securing a handlebar to a bicycle frame comprising a sleeve having an annular rib formed on a lower and outer peripheral portion thereof, a bowl having an annular groove formed in a lower and outer peripheral portion thereof, ball bearing means disposed between said sleeve and said bowl so that said sleeve is freely rotatable relative to said bowl, said bowl and said sleeve having an annular gap formed therebetween, and a gasket including an annular flange formed in an upper portion thereof for engagement with said annular groove of said bowl and an L-shaped member formed in a lower portion thereof for engagement with said annular rib of said sleeve so as to cover and seal said annular gap formed between said sleeve and said bowl, and including a middle portion substantially bellow-shaped so that said gasket maintains contact with said bowl and said sleeve when the width of said annular gap is varied.

5,160,211

POST TO RAILING TIE

Tyrell T. Gilb, Berkeley, Calif., assignor to Simpson Strong-Tie Company, Inc., San Leandro, Calif.

Filed Nov. 13, 1990, Ser. No. 612,207
Int. Cl.[5] F16B *9/00*
U.S. Cl. 403—231 **6 Claims**

1. A post to top railing connection comprising:

a. a wood supporting post having a side face and an end face;

b. a top wood railing having a bottom face in registration with said end face of said wood supporting post;

c. a sheet metal connector including:

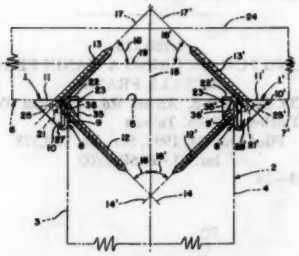
(1) a first member having a portion in registration with said side face of said supporting post;

(2) a second member having a base portion acutely angu-

larly connected to said first member along a bend line disposed in close proximity to said side face of said post and having an edge portion in registration with said bottom face of said top wood railing, and said base portion of said second member is angularly disposed to said bottom face of said top wood railing and said side face of said supporting post;

(3) said portion of said first member is located entirely between said bottom face of said top wood railing and said bend line of said base portion of said second member;

d. a first fastener member having a shank dimensioned for insertion through said first member and into said wood supporting post at an acute angle to said side face of said wood supporting post and a head engaging said first member;



e. a second fastener member having a shank dimensioned for insertion through said second member and into said top wood railing at an acute angle to said bottom face of said top wood railing and in a plane generally parallel and in close relation to a plane of said first fastener member and a head dimensioned for engaging said second member;

f. a third fastener member spaced from said first fastener member having a shank dimensioned for insertion through said first member and into said supporting post and a head engaging said first member;

g. a fourth fastener member spaced from said second fastener member having a shank dimensioned for insertion through said second member and into said top wood railing and a head dimensioned for engaging said second member;

h. said heads of said first and second fastener members are in close proximity; and

i. said heads of said third and fourth fastener members are in close proximity.

5,160,212

CORNER JOINT FOR BUILDING UNITS OF STONE

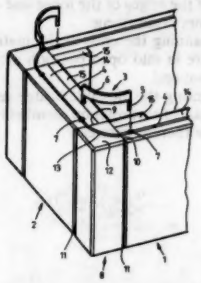
Reijo Vauhkonen, Vihtasuo, Finland, assignor to Suomen Vuolukivi Oy, Nunnanlahti, Finland

Filed Sep. 12, 1991, Ser. No. 757,957

Int. Cl.[5] F16B *12/10*; E04B *1/00*

U.S. Cl. 403—294 **1 Claim**

1. The combination of first and second stone building units which each provides a side joint surface, a corner piece which provides two side joint surfaces which respectively abut said side joint surfaces of said first and second building units, said two side joint surfaces of said corner piece forming an angle with one another, and a metal binding hook for connecting said first and second building units and said corner piece therebetween, said first and second building units and said corner piece each including a groove in an end face thereof in which said binding hook is positionable, said grooves in said end faces of said first and second building units including borings and said groove in said corner piece being curved, said binding hook including pins for positioning in said borings and a



curved web portion which fits in said curved groove in said end face of said corner piece.

5,160,213

COVERING FOR A GROUND OPENING

Hansruedi Spiess, Delemont, and Francois Galvanetto, Alle, both of Switzerland, assignors to Von Roll AG, Gerlafingen, Switzerland

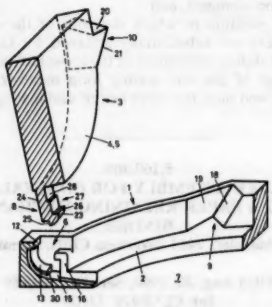
Continuation of Ser. No. 375,774, Jul. 5, 1989. This application Feb. 21, 1990, Ser. No. 659,194

Claims priority, application Switzerland, Jul. 5, 1988, 2546/88

The portion of the term of this patent subsequent to May 21, 2008, has been disclaimed.

Int. Cl.[5] E02D *29/14*

U.S. Cl. 404—25 **7 Claims**



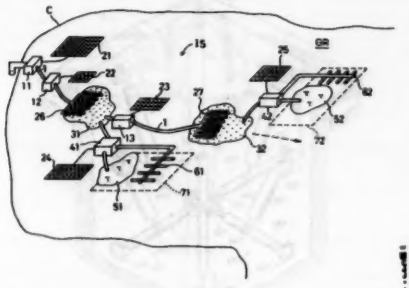
1. A covering for an opening provided in the ground, comprising a frame placed in the ground and a cover for covering said frame and being removable from said frame to give access to the opening, said frame including a bearing surface provided on the inside thereof for supporting said cover, said cover including at least one retaining web shaped on said cover, said frame having at least one recess on the inside thereof receiving said web and being provided with a hinge means, said cover further including at least one cam on an outer circumference thereof, said cam being spaced from the retaining web and provided with a supporting wall sloping towards a plane of the cover, said frame being formed on the inside thereof with at least one niche for receiving said cam and having a bearing surface, said frame further including means for supporting said retaining web as said cover is moved to a closed position thereof, said supporting wall of said cam in said closed position of the cover engaging on said bearing surface of said niche to cause the retaining web supported by said supporting means to be moved into a clearance-free locked position in said recess when said cover is in the closed position.

5,160,214

IRRIGATION SYSTEM AND IRRIGATION METHOD

Mikio Sakurai, and Chikako Sakurai, both of 2274-38 Senbacho, Mito-shi, Ibaraki, Japan

Filed Jan. 23, 1991, Ser. No. 644,773
Claims priority, application Japan, Jan. 23, 1990, 2-14609
Int. Cl.[5] F02B *11/00*
U.S. Cl. 405—36 10 Claims



1. An irrigation system, comprising:

a pump facility for pumping seawater from a sea;

an artificial seawater lake formed in an inland area for storing said seawater pumped up by said pump facility, said stored seawater being exposed to sun and wind to partially evaporate and to thereby increase local atmospheric humidity;

a freshwater producing facility for pumping up said stored seawater from said artificial seawater lake and for producing freshwater from said seawater, said freshwater producing facility being located closer to a projected irrigation area than is said artificial seawater lake, the location of said freshwater producing facility being selected to enable convenient storage of salt produced by extraction of fresh water from seawater processed thereat; and

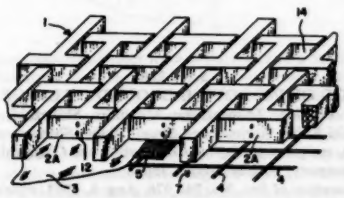
a freshwater supply facility for supplying said freshwater produced by said freshwater producing facility to said projected irrigation area.

5,160,215

GROUND SURFACING AND EROSION CONTROL DEVICE

John S. Jensen, 4651 Mill Pond Rd., Myrtle Beach, S.C. 29577

Filed Apr. 1, 1991, Ser. No. 678,209
Int. Cl.[5] E02B *3/14;* E01C *5/14*
U.S. Cl. 404—46 16 Claims



1. A universally flexible fabricated ground stabilizing surface device for the compaction of soils so that load bearing traffic and load bearing uses can be effected and for erosion control or the like comprising:

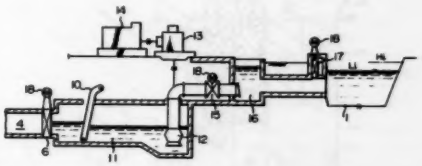
a. plurality of uniform T-shaped building elements secured together forming a continous barrier and surface, said elements being of substantially the same size and configuration, the T-shaped elements arranged in a pattern wherein, except for the periphery of the fabricated device each element has a pair of adjacent elements wherein the T-shaped horizontal portion of an element extends perpendicular to the I or longitudinal portion of the adjacent T-shaped element at the longitudinal midpoint, and means flexibility retaining the building elements in their relative position forming coffer dams for soil retention and compaction.

5,160,216

DRAINAGE DISTRIBUTION AMOUNT DETERMINING METHOD AND DRAINAGE SYSTEM

Kunio Takada, Ibaraki; Kenji Otani, Tsuchiura, and Akira Manabe, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 3, 1991, Ser. No. 770,343
Claims priority, application Japan, Oct. 3, 1990, 2-265977
Int. Cl.[5] E02B *7/20, 7/40*
U.S. Cl. 405—92 9 Claims



1. A method of determining a drainage distribution amount for a drainage system wherein drain water is collected from a drainage path including a small river, guided to a plurality of drainage pump facilities, and drained into a destination river, said method comprising the steps of:

determining a drainage distribution amount for each of said plurality of drainage pump facilities in accordance with an actual precipitation or estimated precipitation;

estimating a river water level at a drainage point of each of said plurality of drainage pump facilities in accordance with said drainage distribution amount and a change in a detected water level at an upstream of said destination river; and

correcting said drainage distribution amount for each of said plurality of drainage pump facilities so as to make said estimated river water level have a value equal to or smaller than an upper limit of said river water level at said drainage point.

5,160,217

METHOD OF IN SITU DECONTAMINATION

Nancy Metzer, Exton, and Michael Corbin, Downingtown, both of Pa., assignors to Roy F. Weston, Inc., West Chester, Pa.

Continuation-in-part of Ser. No. 565,515, Aug. 10, 1990, Pat. No. 5,106,232. This application Apr. 19, 1991, Ser. No. 687,983
The portion of the term of this patent subsequent to Apr. 21, 2009, has been disclaimed.
Int. Cl.[5] B09B *1/00*
U.S. Cl. 405—128 20 Claims

1. A process for removing contaminants from a vadose zone above a water table having a capillary fringe comprising the steps of:

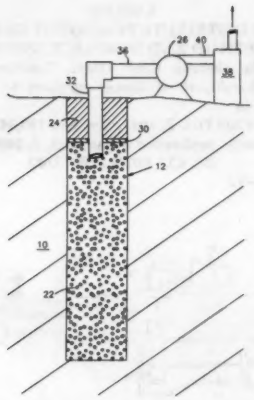
establishing a borehole into the vadose zone and into at least the top of the capillary fringe of the water table;

introducing a porous fill material into the borehole and positioning the fill material adjacent to portions of the vadose zone containing the contaminant;

positioning one end of a hollow conduit having a solid, air impermeable side wall into the borehole, the conduit having its other end connected to pump means capable of applying suction to the conduit;

sealing an upper portion of the borehole around the conduit from the atmosphere;

applying suction to the conduit and the borehole to reduce pressure in portions of the vadose zone and cause 1) air and contaminant vapors to move through the vadose zone and along the top of the capillary fringe and into the borehole and 2) creation of a liquid-vapor contaminant



concentration gradient in the vadose zone and along the top of the capillary fringe to facilitate vaporization of liquid contaminant and movement of the vapor through the vadose zone into the borehole; and

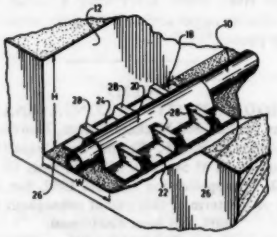
removing air and contaminant vapors from the borehole.

5,160,218

IN-GROUND SECUREMENT OF PIPELINES AND THE LIKE

Michael F. Hill, Calgary, Canada, assignor to Nova Corporation of Alberta, Calgary, Canada

Filed Nov. 5, 1990, Ser. No. 608,680
Int. Cl.[5] F16L *1/00*
U.S. Cl. 405—154 **8 Claims**



1. A device suitable for assisting in locating and securing a fluid-enclosing device in a subterranean environment, consisting essentially of:

an elongate rigid body dimensioned so that the length thereof exceeds the width thereof and having a central longitudinally-extending raised region shaped to receive the cross-sectional dimension of said fluid-enclosing device wholly therewithin, and generally planar flanges directed outwardly from each side of said central raised region in a common plane to free longitudinal and lateral edges,

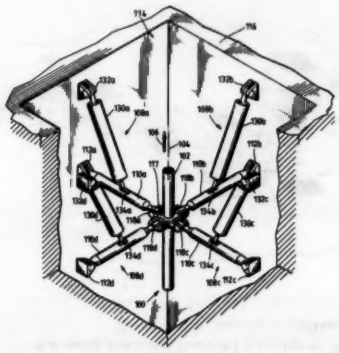
each of said generally planar flanges having at least one raised rib formed therein between the longitudinal extremities of the flange and extending from the central raised region to the lateral extremity of said flange.

5,160,219

VARIABLE SPRING RATE RISER TENSIONER SYSTEM

Edward J. Arlt, Fort Worth, Tex., assignor to LTV Energy Products Company, Garland, Tex.

Filed Jan. 15, 1991, Ser. No. 641,541
Int. Cl.[5] E02D *21/00*
U.S. Cl. 405—195.1 **26 Claims**



1. A riser tensioner system for applying a tensioning force to a riser and allowing a floating platform to move within a preselected range along a longitudinal axis of said riser, said system comprising:

a spring and a lever forming an assembly, said assembly being coupled to said riser and to said platform, said spring having a spring rate, said lever being coupled to said spring to control orientation of said spring relative to said riser to response to relative movement between said platform and said riser along said longitudinal axis, thereby controllably varying a magnitude of a vertical component of said spring rate in proportion to said relative movement such that said tensioning force remains substantially constant through said range.

5,160,220

METHOD OF IMPROVING GROUND OF LARGE AREA

Hiroshi Yoshida, Tokorozawa; Mitsuhiro Shibazaki, Tokyo; Hiroaki Kubo, Nerima, and Shunji Jinbo, Shinagawa, all of Japan, assignors to Kajima Corporation and Chemical Grouting Company, both of Tokyo, Japan

Continuation of Ser. No. 741,976, Aug. 6, 1991, which is a continuation of Ser. No. 471,617, Jan. 29, 1990, abandoned. This application Dec. 23, 1991, Ser. No. 811,981
Claims priority, application Japan, Jan. 27, 1989, 1-16323
Int. Cl.[5] E02D *5/62*
U.S. Cl. 405—236 **5 Claims**

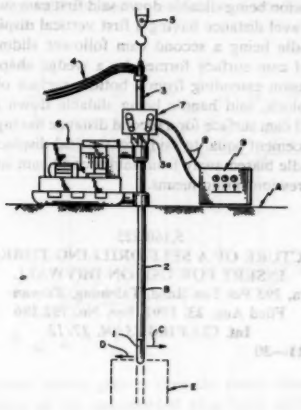
1. A method of improving an area of ground by forming an underground column, comprising:

inserting a pipe into a hole previously dug in the ground;

injecting a high pressure liquid toward a wall of said hole;

injecting a ground improving liquid; and

drawing a pipe upwards while applying a vertical vibration to said pipe, and



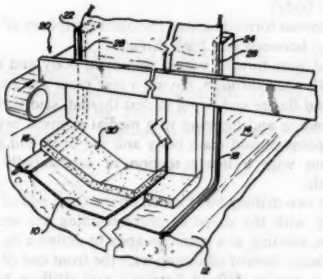
repetitively colliding a stream of said high pressure liquid with the same position of the ground, so that a grouting distance between said pipe and said wall is increased.

5,160,221

WATERWAY LINER

Fred P. Rohe, Elk Rapids, and Bret Bell, Traverse City, both of Mich., assignors to Environmental Protection, Inc., Kalkaska, Mich.

Filed Jun. 10, 1991, Ser. No. 712,395
Int. Cl.[5] E02B *11/00*
U.S. Cl. 405—270 **8 Claims**



8. In combination, a liner for a waterway and a machine for laying the liner along a bottom of the waterway, said liner adapted to overlie the bottom of the waterway while a cementious layer covers said liner, said machine having two elongated, spaced apart and parallel guide rails, said guide rails extending substantially vertically and each rail having a hollow interior and longitudinally extending slot open at each end and open to the interior of said rail, said liner comprising:

an elongated, flexible and water impervious sheet of polyvinyl chloride material, said sheet having two spaced apart side edges,

at least one elongated sheet extension having two spaced apart and parallel edges,

a strand extending longitudinally adjacent one edge of said sheet extension,

means for securing said strand to said sheet extension comprising a flap along said one edge of said sheet extension, said flap being wrapped around and encircling its associated strand so that one side of said flap flatly abuts against the sheet extension,

heat sealing means for bonding said one side of said flap and said sheet extension together,

means for securing the other edge of said sheet extension along one edge of said sheet,

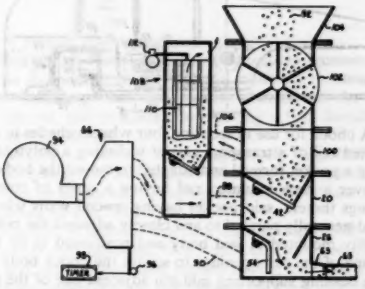
wherein said strand has a diameter greater than the width of said slot, said strand being longitudinally slidably positioned within the interior of one rail.

5,160,222

PNEUMATIC CONVEYING SYSTEM

Richard D. Noland, Lake Quivira, Kans., assignor to Tech-Air, Inc., Shawnee Mission, Kans.

Filed Nov. 30, 1990, Ser. No. 621,329
Int. Cl.[5] B65G *53/12, 53/36, 53/40, 53/46*
U.S. Cl. 406—124 **14 Claims**



1. An apparatus for introducing material into an airstream for pneumatic conveyance, comprising:

housing means adapted to receive the material at an inlet and expel the material in an entraining airstream at an exit;

primary check valve means disposed downstream of said inlet and adapted to receive the material from said inlet, said primary check valve means including a primary product hole adapted to allow the material to move therethrough and a primary check valve member mounted adjacent to said primary product hole and movable between a first position closing said primary product hole and a second position spaced from said primary product hole;

a primary air inlet disposed downstream of said primary check valve means and adapted to channel the entraining airstream therethrough, said primary air inlet being disposed in facing relation to said primary check valve member;

secondary check valve means disposed downstream of said primary air inlet and adapted to receive the material from said primary check valve means, said secondary check valve means being disposed upstream of said exit of said housing means and said secondary check valve means including a secondary product hole adapted to allow the material to move therethrough and a secondary check valve member mounted adjacent to said secondary product hole and movable between a first position closing said secondary product hole and a second position spaced from said secondary product hole;

a secondary air inlet disposed downstream of said secondary check valve means and upstream of said exit of said housing means and adapted to channel the entraining airstream therethrough, said secondary air inlet being disposed in facing relation to said secondary check valve member;

a source of air having sufficient current and pressure to entrain the material, such current and pressure forming the entraining airstream; and

means for connecting said entraining air source alternately to said primary air inlet and said secondary air inlet, whereby the air current and pressure will intermittently

act upon each of said check valve members to move said check valve member from said second position to said first position, alternately opening and closing said check valve means and entraining the material downstream thereof.

5,160,223

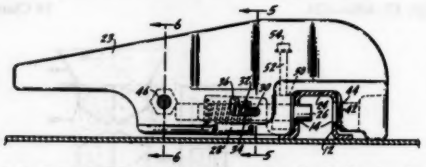
POLYMER WHEEL CHOCK FOR USE ON VEHICLE TRANSPORT CARRIERS

Robert F. Seitz, Batavia, Ill., assignor to Gen-Tech, Inc., North Aurora, Ill.

Continuation of Ser. No. 573,732, Aug. 28, 1990, abandoned. This application Nov. 18, 1991, Ser. No. 794,785

Int. Cl.[5] B60P *3/07*

U.S. Cl. 410—9 **3 Claims**



1. A chock for use in securing four wheel vehicles to a deck mounted rail of a transport carrier including a polymer body having a pocket formed and adapted to mount the body laterally over a deck mounted rail having a series of transverse openings therein, said pocket having spaced walls which extended generally parallel to and closely adjacent the rail, a pin movably mounted in said body and positioned to be moved into one of the rail openings to secure the chock body to the rail, a bushing supporting said pin adjacent one of the pocket walls, said bushing being enclosed by said polymer chock body, a thin, elongated vertical load member attached to and extending from said bushing toward the top of said chock and to a level above the pocket, said load member being encased by said polymer chock body, said vertical load member having an enlarged area at the upper end thereof, which enlarged area distributes the vertical load on the chock through a substantial vertical cross section of the chock body.

5,160,224

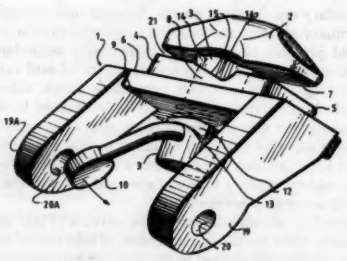
CAM ACTION TWIST LOCK ASSEMBLY FOR FREIGHT CONTAINERS

Phillip Schwiebert, P.O. Box 612106, San Jose, Calif. 95161

Filed Feb. 14, 1992, Ser. No. 835,551

Int. Cl.[5] B60P *1/64*

U.S. Cl. 410—82 **2 Claims**



1. A twist lock assembly for freight containers comprising in combination:

a support block,

a locking cone having a shaft rotatable within an aperture of said support block, said shaft having a handle for rotation of said locking cone secured to said shaft into a locking position;

said support block further including a first cam assembly, said first cam assembly including a first cam follower protrusion secured to said locking cone, said first cam follower protrusion slidable along a first cam surface indented within said support block, said first cam follower protrusion being slidable down said first cam surface for a first travel distance having a first vertical displacement;

said handle being a second cam follower sliding along a second cam surface formed by a wedge shaped second protrusion extending from a bottom surface of said support block, said handle being slidable down along said second cam surface for a second distance having a vertical displacement equal to said first vertical displacement,

said handle biased away from said second cam surface by a compression spring means.

5,160,225

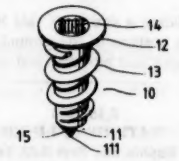
STRUCTURE OF A SELF-DRILLING THREADED INSERT FOR USE ON DRYWALL

T. P. Chern, 293 Pei Tun Road, Taichung, Taiwan

Filed Aug. 23, 1991, Ser. No. 752,186

Int. Cl.[5] F16B *13/04, 37/12*

U.S. Cl. 411—30 **3 Claims**



1. A self drilling threaded insert for use on drywalls and the like comprising:

a generally cylindrical main body with a flange formed on the rear end thereof;

a high thread formed around the outer periphery of said main body;

a low thread formed around the outer periphery of said main body, between said high thread;

a fluted bore formed within said main body and extending axially therethrough, having a rear taper section adjacent to said flange and being widest thereat, said taper section extending and tapering to a medial position between the midpoint of said main body and the front end thereof to adjoin with a linear section of substantially constant width;

at least two drilling bits formed on the front end of said main body with the shape of corresponding arc sectors of a cone, meeting at a common apex to define a tip and with the bases thereof adjoining with the front end of said main body, spaces defined between said drilling bits are in communication with the front entrance of said bore;

whereby, said self drilling threaded insert can be drilled into a drywall with said high and low threads tapped therein, a screw can be inserted into said bore of said insert and tap into the inner wall thereof, the tip of said screw can extend past said drilling bits causing said drilling bits to separate at said tip and expand laterally outwards, possibly embedding into said drywall.

5,160,226

TAPERED EXPANSION SEALING PLUG

Leighton Lee, II, Guilford, Conn., assignor to The Lee Company, Westbrook, Conn.

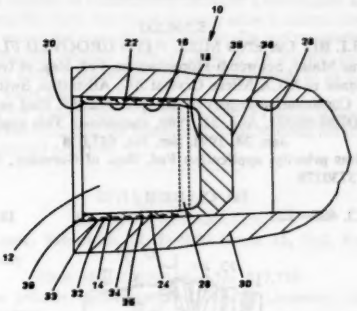
Filed Feb. 22, 1990, Ser. No. 483,235

Int. Cl.[5] F16B *13/06*

U.S. Cl. 411—72 **16 Claims**

1. An expansion sealing plug, comprising a plug body having

a first axial end and a second axial end of larger diameter than the first end, with an outer surface that is generally uniformly tapered between the first and second ends at an included angle of taper of from about 1.0 to about 7.0 degrees, said plug body having a central bore, and an expansion means having an out-



side diameter that is greater than the inside diameter of the central bore of the unexpanded plug body and adapted to radially expand the tapered outer surface of the plug body into frictional locking engagement with the wall of a plug mounting bore without substantially altering the taper of the outer surface.

5,160,227

SELF-LOCKING NUT

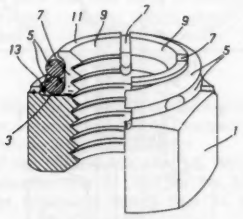
Giancarlo Tramezzani, Ponte Tresa, Switzerland, assignor to Alian International Aktiengesellschaft, Triesen, Liechtenstein

Filed Oct. 25, 1991, Ser. No. 782,821

Claims priority, application Switzerland, Jul. 10, 1991, 2054/91

Int. Cl.[5] F16B *39/22, 39/284*

U.S. Cl. 411—278 **5 Claims**



1. An improved self-locking nut including an upper threaded collar equipped with U-shaped longitudinal slots defining in the collar a plurality of circular arc segments compressed by a helical external spring, said spring being of such a width as to prevent the mutual contact of said circular arc segments, wherein said spring, before being assembled on said segments is hot-galvanized, in order to provide a better protection from oxidation.

5,160,228

CUTTING TOOL WITH CLAMPED-ON INSERTS

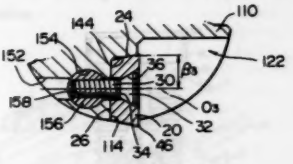
Tatsuo Arai; Masaaki Nakayama, and Takayoshi Saito, all of Tokyo, Japan, assignors to Mitsubishi Materials Corporation, Tokyo, Japan

Filed Mar. 29, 1991, Ser. No. 677,503

Claims priority, application Japan, Mar. 30, 1990, 2-83732

Int. Cl.[5] A23C *5/22*

U.S. Cl. 407—32 **7 Claims**



1. A cutting tool comprising:

a tool body having a plurality of mounting recesses formed on an end thereof, each of said mounting recesses having a mounting face respectively formed at the bottom thereof, said mounting face having a first threaded hole formed therein;

a plurality of inserts, each respectively disposed on said mounting face and secured pressedly onto said mounting face by means of a clamping screw screwed into said first threaded hole, and

a plurality of reduced hardness regions respectively formed under said mounting face inside said tool body, each of said reduced hardness regions having said first threaded hole formed therein, said reduced hardness regions having a hardness lower than the hardness of said tool body,

each of said reduced hardness regions including a reduced hardness member having a hardness after treatment in a hardening process lower than a hardness of said tool body after the hardening process, said reduced hardness members embeddedly disposed under said mounting face inside said tool body before the hardening process.

5,160,229

MIST-SPOUTING TYPE DRILLING DEVICE

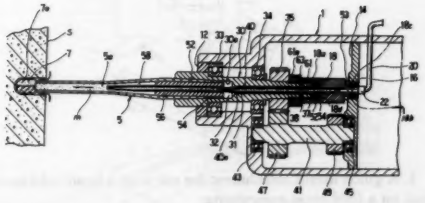
Yousuke Yoshino, 225, Oaza-terao, Kawagoe-shi, Saitama-ken, Japan 356

Filed Oct. 4, 1991, Ser. No. 771,235

Claims priority, application Japan, Oct. 5, 1990, 2-266638

Int. Cl.[5] B23B *51/06*

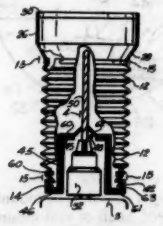
U.S. Cl. 408—59 **2 Claims**



1. A mist-spouting type drilling device comprising a rotary drill having an axial mist passage and a cutting bit, nozzle disposed in said mist passage, a hollow shaft detachably connected to said rotary drill and incorporating an anti-counterflow nozzle provided at its leading end with a tapered orifice portion fitting into said throat nozzle, a mist-supply pipe for supplying atomized water, a joint member for connecting said mist-supply pipe to said anti-counterflow nozzle, and sealing

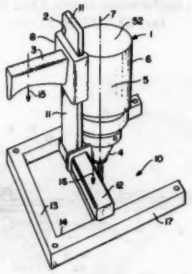
means disposed between said joint member and said hollow shaft.

5,160,230
SAFETY DEBRIS CATCHER
Laverne F. Cuevas, P.O. Box 479, Long Beach, Miss. 39560
Filed Sep. 5, 1991, Ser. No. 755,612
Int. Cl.[5] B23B *45/00*
U.S. Cl. 408—67 6 Claims



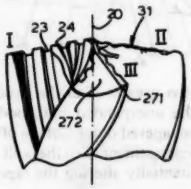
1. A safety debris catcher or a rotary tool having a rotating working component, comprising:
a resilient, tubular, sleeve-like bellows having a sleeve at its inner end and a debris collector at its outer end;
the bellows being compressible axially and fitting around the working component of the tool;
a non-rotating tailpiece connected to said bellows forming a chip chamber adapted to enclose the working component;
said chip chamber having an annular tubular collecting space axially disposed about a portion of the rotating component;
the chip chamber having an internal portion rotatably connected to said working component.

5,160,231
PRESS WITH QUICK ATTACH TOOL ALIGNMENT
Bernard Miller, 5600 Munhall Rd., Pittsburgh, Pa. 15217
Continuation-in-part of Ser. No. 346,903, May 2, 1989, Pat. No. 5,006,022. This application Apr. 8, 1991, Ser. No. 681,369
Int. Cl.[5] B23B *45/14*
U.S. Cl. 408—135 20 Claims



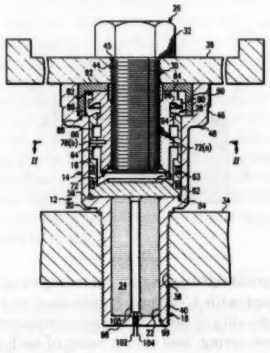
1. A guide means attachment for use with a hand held power tool on a tool press comprising:
an elongated pressure plate for attachment essentially perpendicular to a column of said tool press;
an attachment means for securing said pressure plate onto said tool press;
an elongated guide and alignment means attached to and extending essentially perpendicular from said elongated pressure plate for positioning said power tool on said elongated pressure plate with the axis of said power tool and said elongated guide and alignment means essentially parallel to said column of said tool press;
a locking means slidably attached to said elongated guide and alignment means and clampable thereto for locking said power tool against said pressure plate and onto said elongated guide and alignment means.

5,160,232
DRILL BIT OR END MILL WITH GROOVED FLUTES
Andreas Maier, Schwendi-Hörenhausen, Fed. Rep. of Germany, assignor to MCA Micro Crystal AG, Allstatten, Switzerland
Continuation-in-part of Ser. No. 372,355, filed as PCT/DE88/00531, Aug. 31, 1988, abandoned. This application Jan. 28, 1991, Ser. No. 647,038
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1987, 3730378
Int. Cl.[5] B23B *51/02*
U.S. Cl. 408—223 18 Claims



1. A cutting tool in the form of a drill bit or end-milling tool comprising an elongated body formed with at least one cutting edge defined by a flank of a flute running helically relative to a rotation axis of the body and having leading and trailing flanks one of which is formed generally along its full length with wavelike, helical, and spaced ribs and a plurality of guide grooves, the depths of the grooves and heights of the ribs increasing toward the cutting edge.

5,160,233
FASTENING APPARATUS HAVING SHAPE MEMORY ALLOY ACTUATOR
McKinnis Darin N., Houston, Tex., assignor to The United State of America as representd by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.
Filed May 13, 1992, Ser. No. 882,408
Int. Cl.[5] F16B *37/08, 39/36*
U.S. Cl. 411—433 10 Claims



1. A releasable fastening apparatus, comprising:
a housing;
a connecting member;
a locking mechanism supported by the housing and having a

triggering member translatable within the housing between first and second positions, the locking mechanism comprising means for engaging the connecting member upon the triggering member being in its first position and for releasing the connecting member upon the triggering member being translated to its second position;

a shape memory alloy actuator contained within the housing and capable of transitioning between a martensitic and an austenitic state, the shape memory alloy actuator comprising means for expanding longitudinally and translating the triggering member from its first to its second position upon being transitioned from its martensitic to its austenitic state; and

means for transitioning the shape memory alloy actuator to its austenitic state for translating the triggering member to its second position.

5,160,234

BINDING APPARATUS

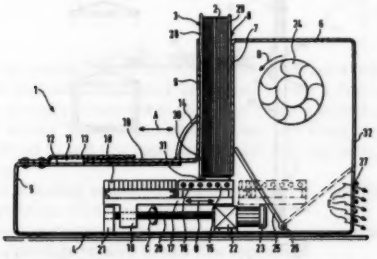
Peter Lazar, Tannenstr. 11, D-4040 Neuss 21, Fed. Rep. of Germany

Filed May 2, 1990, Ser. No. 517,715

Claims priority, application Fed. Rep. of Germany, May 3, 1989, 3914571

Int. Cl.[5] B42B *9/00*

U.S. Cl. 412—20 **36 Claims**



1. A sheet binder, comprising:

a) a frame;

b) first and second spaced parallel support walls operably associated with said frame for receiving therebetween a plurality of sheets to be bound, said walls each have a first end for defining therebetween an opening into which the sheets are inserted and a second end defining therebetween a binding zone; and

c) a heating plate and a deposition base operably associated with said second ends for applying an adhesive strip to associated edges of the sheets for binding the sheets together, said plate and base being displaceably supported within said frame for being moved linearly and alternatingly into and out of said binding zone.

5,160,235

APPARATUS FOR RELOCATING ARRANGED PLANTS

Nikolaus Bikow, Innsbruck, Austria, assignor to Visser's-Gravendeel Holding B.V., Netherlands

Continuation of Ser. No. 501,890, Mar. 30, 1990, abandoned.

This application Mar. 5, 1992, Ser. No. 845,363

Claims priority, application Austria, Mar. 31, 1989, 741/89

Int. Cl.[5] A01C *11/02*

U.S. Cl. 414—416 **14 Claims**

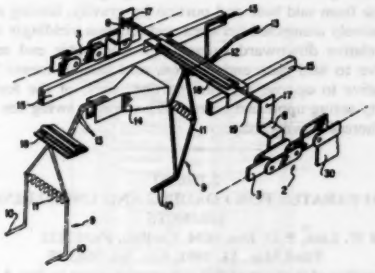
4. An apparatus for relocating plants arranged in a predetermined order which are gripped one by one at a pick-up location and relocated to an unload station, said apparatus comprising:

a frame;

a continuous transport element coupled to said frame, said transport element being guided along direction changing guiding elements, each of said direction changing guiding elements being rotatable about a corresponding first rotating shaft;

at least one carrier element coupled to said transport element;

a gripper coupled to each carrier element, each of said grippers being rotatably suspended via a second rotating shaft extending through its corresponding carrier element, said second rotating shafts being essentially parallel to said first rotating shafts, wherein each of said grippers includes two spreadable grip-fingers which grip a plant including the rootball at the pick-up location and releases it at the unload station;



a gripper bearing disposed between each carrier element and said corresponding second rotating shaft; and

whereby said gripper bearing is moved in a growing direction of the plants over a range substantially equal to the pick-up height of the plants;

wherein a portion of the transport element immediately adjacent to and leading towards the pick-up station is substantially horizontal and perpendicular to a substantially vertical portion of the transport element immediately adjacent to and leading away from the pick-up station.

5,160,236

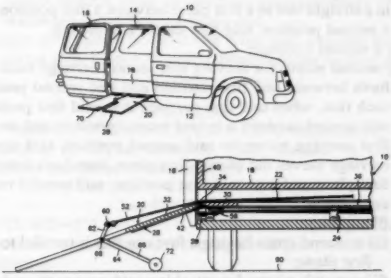
RETRACTABLE VAN SIDE DOOR RAMP

Edward M. Redding, Suite A220 4300 San Mateo Blvd. NE., Albuquerque, N. Mex. 87110, and Charles E. Redding, 361 S. Bateman Cir., Barrington Hills, Ill. 60010

Filed Jul. 31, 1991, Ser. No. 738,628

Int. Cl.[5] B60P *1/00*

U.S. Cl. 414—537 **20 Claims**



1. A vehicle and loading ramp combination including a vehicle having a floor assembly and an upstanding wall projecting upwardly from said floor assembly and having a door opening formed therein including a lower margin, an elongated ramp including a relatively short extendable and retractable inner base end portion and a considerably longer extendable and retractable outer end portion, said portions being

arranged in adjacent end aligned relation and pivotally joined at adjacent ends for limited relative angular displacement about a horizontal transverse axis, said ramp portions and floor assembly including coacting support and guide means supporting said ramp for guided shifting between a retracted position with the entire ramp retracted inwardly of said opening and a limited extended position with said inner end portion retained inwardly of but adjacent said opening and at least a major length portion of said outer end portion extending outward of said opening, said coacting support and guide means being constructed such that the guided support of said outer end portion from said floor assembly is terminated as said ramp is extended to said limited extended position, thereby freeing said outer end portion for downward swinging of the end thereof remote from said base end portion by gravity, biasing means operatively connected between said sections yieldingly resisting relative downward swinging of said outer end section relative to said base end portion, said biasing means being operative to oppose a major portion, only, of the force of gravity acting upon said outer end portion to swing the outer end thereof downwardly.

5,160,237

APPARATUS FOR LOADING AND UNLOADING OBJECTS

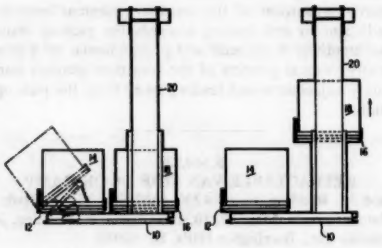
David W. Lutz, P.O. Box 4444, Carlisle, Pa. 17013

Filed Mar. 11, 1991, Ser. No. 666,928

The portion of the term of this patent subsequent to Jun. 4, 2008, has been disclaimed.

Int. Cl.[5] B65G 7/00

U.S. Cl. 414—609 **98 Claims**



21. Apparatus for loading and unloading objects, said apparatus comprising:

(a) a first carriage;

(b) first means for moving said first carriage back and forth in a straight line in a first plane between a first position and a second position, said first means comprising:

(c) a second carriage;

(d) second means for moving said second carriage back and forth between said first position and said second position such that, when said first carriage is in said first position, said second carriage is in said second position and, as said first carriage moves to said second position, said second carriage moves out of said first plane, then back into said first plane and into said first position, said second means comprising:

(i) a gantry;

(ii) a second chain having a first run that is parallel to said first plane;

(iii) seventh means for attaching said gantry to said first run of said second chain; and

(iv) eighth means for moving said second carriage relative to said gantry, said eighth means comprising:

(A) a second fluid cylinder comprising a cylinder mounted on said gantry and a piston;

(B) a first sheave mounted on said piston; and

(C) a third chain trained over said first sheave and having a first end attached to said second carriage and a second end attached to said cylinder; and

(e) ninth means for tilting both carriages to provide ready access to the inside of each carriage at least when each carriage is in said first position.

5,160,238

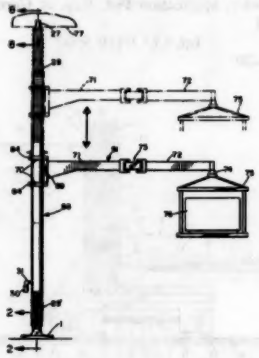
SHAFT TRAVEL DEVICES SUCH AS VERTICAL LIFT ARM DEVICES

Goro Kambara, Valley Center, Calif., assignor to Hermco, San Marcos, Calif.

Filed Jul. 18, 1990, Ser. No. 554,781

Int. Cl.[5] B65G 7/00

U.S. Cl. 414—663 **44 Claims**



1. A pneumatic cylinder for support of a radially extending load and movement of said load around and along a cylindrical shaft under a driving force of gas introduced into said cylinder and acting in cooperation with an internal piston, which cylinder comprises:

a hollow extended tube having a first end and a second end and a head at each of said ends, each of said heads having a centrally located aperture therethrough for passage of said shaft;

sealing means at each end of said tube to form a gas tight annular chamber within said tube and surrounding said shaft;

arm support means extending along and connected to an outer side of said tube and being longer than said tube; said support means having first and second end portions connected to respective heads of said tube and extending axially therebeyond;

self-aligning bearing means mounted within said first and second end portions of said arm support means and positioned to be in rotationally and axially movable bearing contact with said shaft; and

load transfer means between said end portions of said arm support and said self-aligning bearing means for transferring said load applied to said arm through said bearing means to said shaft without causing said bearing means to twist from a co-axial alignment with said shaft and to prevent transfer of distorting force to said tube;

whereby said cylinder is capable of traversing both axially along and radially around said shaft to cause said arm support to transfer said load from a first position to a second position.

5,160,239

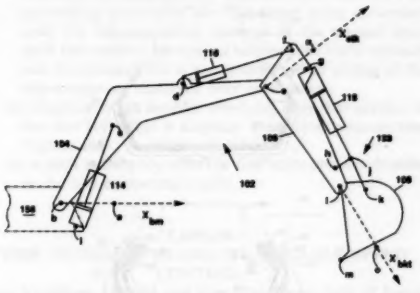
COORDINATED CONTROL FOR A WORK IMPLEMENT

William E. Allen; Paul D. Anderson; Walter J. Bradbury; John M. Hadank, and Richard B. League, all of Peoria, Ill., assignors to Caterpillar Inc., Peoria, Ill.

Continuation-in-part of Ser. No. 501,381, Mar. 19, 1990, Pat. No. 5,002,454, which is a continuation of Ser. No. 241,654, Sep. 8, 1988, abandoned. This application Sep. 6, 1990, Ser. No. 578,909

Int. Cl.[5] E02F *3/32*

U.S. Cl. 414—699 14 Claims



1. A control system for controllably movign a vehicle's work implement, said work implement having a first appendage pivotally connected to said vehicle, and a second appendage having first and second end points and being pivotally connected to said first appendage at said first end point, comprising:

first actuating means for controllably moving said first appendage relative to said vehicle;

second actuating means for controllably moving said second appendage relative to said first appendage;

operator interface means for producing first and second control signals, said control signals being indicative of a desired linear velocity;

logic means for receiving said first control signal and rseponsively producing a substantially linear motion of the second end point of said second appendage in a first work direction along a first work axis by coordinating said first and second actuating means and for receiving said second control signal and responsively producing a substantially linear motion of the second end point of said second appendage in a second work direction along said first work axis by coordinating said first and second acutating means, wherein said linear motion has a velocity proportional to said respective control signal; and

wherein said operator interface means includes means for producing third and fourth control signals and said logic means includes means for receiving said third control signal and responsively producing a substantially linear motion of the second end point of said second appendage in a third work direction along a second work axis by coordinating said first and second actuating means, and for receiving said fourth control signal and responsively producing a substantially linear motion of the second end point of said second appendage in a fourth work direction along said second work axis by coordinating said first and second actuating means, said fourth work direction being opposite said third work direction, said second work axis being substantially perpendicular to said first work axis, and wherein said linear motion in said third and fourth work directions having velocities proportional to said third and fourth control signals, respectively.

5,160,240

CENTRIFUGAL PUMP WITH MODULAR BEARING SUPPORT FOR PUMPING FLUIDS CONTAINING ABRASIVE PARTICLES

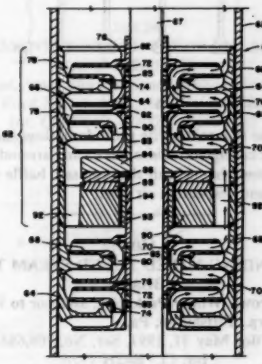
Brown L. Wilson, Tulsa, Okla., assignor to Oil Dynamics, Inc., Tulsa, Okla.

Continuation of Ser. No. 328,209, Mar. 24, 1989, which is a continuation of Ser. No. 64,685, Jun. 22, 1987, Pat. No. 4,872,808. This application May 15, 1991, Ser. No. 701,451

The portion of the term of this patent subsequent to Jul. 23, 2008, has been disclaimed.

Int. Cl.[5] F04D *29/02*

U.S. Cl. 415—170.1 1 Claim



1. A thrust bearing assembly for a submersible liquid pump stage comprising: said pump stage having at least one rotatable impeller positioned relative to a fixed diffuser, the diffuser forming an outer casing for said pump stage;

a rotatable shaft means axially positioned in said stage for rotating said impeller in one direction;

a thrust plate connected to said rotatable shaft and communicating with a stationary thrust bearing plate, said thrust plate having a flat faced bearing surface which rotatably contacts a corresponding flat face of said stationary thrust bearing plate;

said stationary thrust bearing plate supported to said outer casing, and having at least one lubricating groove in said corresponding flat face, said groove being open toward said flat faced bearing surface of said thrust plate, and extending partially radially outwardly from an inner portion of said flat faced surface to an outer periphery of said stationary thrust bearing plate; and

means to transmit down thrust from said impeller to said thrust plate thence to said stationary thrust bearing plate.

5,160,241

MULTI-PORT AIR CHANNELING ASSEMBLY

Christopher C. Glynn, Hamilton, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Sep. 9, 1991, Ser. No. 756,654

Int. Cl.[5] F01D *25/24*

U.S. Cl. 415—175 11 Claims

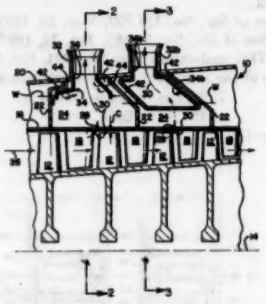
1. An air channeling assemblying for a gas turbine engine comprising:

an annular outer casing having a plurality of circumferentially spaced apart air ports;

an annular inner casing disposed coaxially with said outer casing and spaced radially inwardly therefrom to define a plenum; and

a plurality of circumferentially extending, arcuate baffles, each baffle being spaced radially inwardly from said outer casing inside said plenum, and having an intermediate

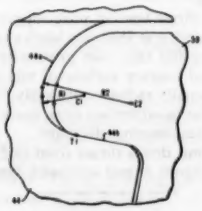
opening joined in flow communication with a respective one of said air ports, and first and second ends extending circumferentially oppositely away from said intermediate opening so that said baffle provides a flow shield between said inner casing and said outer casing around each of said air ports and channels air through said baffle intermediate opening and respective air port.



5,160,242
FREESTANDING MIXED TUNED STEAM TURBINE BLADE

Wilmott G. Brown, Winter Park, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 31, 1991, Ser. No. 708,655
Int. Cl.[5] B63H *1/16*
U.S. Cl. 416—193 A 17 Claims



1. A freestanding mixed tuned taper-twisted steam turbine blade having an X—X axis parallel to a rotor axis, comprising:

a root portion having a root center line defined by a root center line radius;

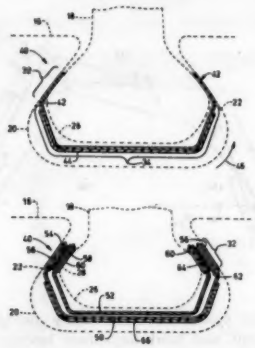
a platform portion connected to the root portion; and

an airfoil portion connected to the platform portion and having a leading edge, a trailing edge, a convex suction-side surface, a concave pressure-side surface and a profiled tip, the platform portion having a concave edge, a convex edge, a first end in vertical proximity to the leading edge of the airfoil portion and a second end in vertical porixmity to the trailing edge of the airfoil portion, the concave edge being sloped toward sthe root center line radius at a predetermined angle of slope to define an arcuate sloped surface, and having a sloped flat cut-out surface formed at the second end of the platform portion, the flat cut-out surface having the same predetermined angle of slope as the concave edge and sloping towards the X—X axis.

5,160,243
TURBINE BLADE WEAR PROTECTION SYSTEM WITH MULTILAYER SHIM

Fredrick C. Herzner, Fairfield; Jerome A. Juenger, and Peter Wayte, both of Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Jan. 15, 1991, Ser. No. 641,230
Int. Cl.[5] F01D *5/30*
U.S. Cl. 416—220 R 15 Claims



1. An assembly for a turbine engine, comprising:

a titanium rotor having a dovetail slot in a rotor circumference thereof, the dovetail slot including at least a pair of sidewalls diverging in a direction from the circumference toward an inward portion of the rotor, and terminating at a bottom;

a titanium blade having a dovetail sized to fit into the dovetail slot and contact the rotor along a pair of contacting regions on the inwardly diverging sidewalls of the dovetail slot, one contacting region being located on each side of the dovetail slot, there remaining a non-contacting region between the blade dovetail and the dovetail slot; and

a shim disposed between the blade dovetail and the dovetail slot, the shim including

(a) an anti-fretting layer interposed between the dovetail and the dovetail slot over both the contacting regions and the non-contacting region, the anti-fretting layer being formed of a material that does not exhibit fretting when rubbed against titanium,

(b) a doubler overlying only that portion of the anti-fretting layer that is disposed over the non-contacting region, and

(c) a joint joining together the anti-fretting layer and the doubler in the non-contacting region.

6. An assembly for a turbine engine, comprising:

a titanium rotor having a dovetail slot in the circumference thereof, the dovetail slot including at least a pair of sidewalls diverging in a direction from the circumference toward an inward portion of the rotor, and terminating at a bottom;

a titanium blade having a dovetail sized to fit into the dovetail slot and contact the rotor along a pair of contacting regions on the inwardly diverging sidewalls of the dovetail slot, one contacting region being located on each side of the dovetail slot, there remaining a non-contacting region between the blade dovetail and the dovetail slot; and

a multilayer shim disposed between the dovetail and the dovetail slot, the shim including:

(a) a first layer adjacent the dovetail slot and having an inner and an outer surface, the first layer having a slip-inhibiting material on the outer surface lying adjacent the contacting regions of the rotor dovetail slot, and a slip-promoting material on the inner surface oppositely disposed from the outer surface;

(b) a second layer adjacent the blade dovetail and having an inner and an outer surface, the second layer having a slip-inhibiting material on the inner surface lying adjacent the contacting regions of the blade dovetail, and a slip-promoting material on the outer surface oppositely disposed from the inner surface, the slip-inhibiting material of each layer being in contact with the adjacent titanium piece and acting to inhibit sliding movement between the shim and the titanium piece, and the slip-promoting material of the first layer being in contact with the slip-promoting material of the second layer such that relative movement between the blade dovetail and the dovetail slot is accommodated by sliding of the slip-promoting materials over each other;

(c) a high strength doubler overlying only that portion of the first layer that is disposed over the non-contacting region; and

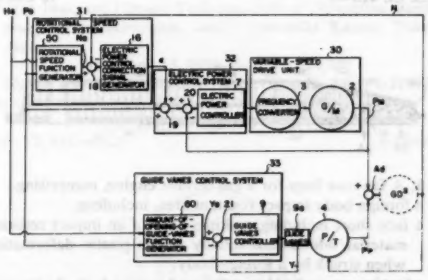
(d) a joint joining together the first layer and the doubler in the non-contacting region.

5,160,244

PUMP SYSTEM OPERABLE BY VARIABLE-SPEED CONTROL

Takao Kuwabara, Hitachi, and Eizo Kita, Kyoto, both of Japan, assignors to Hitachi, Ltd., Tokyo and Kansai Electric Power Co., Ltd., Osaka, both of, Japan

Filed Aug. 8, 1990, Ser. No. 564,138
Claims priority, application Japan, Aug. 8, 1989, 1-205205
Int. Cl.[5] F04D *15/00*
U.S. Cl. 417—36 **26 Claims**



1. A variable-speed pump system comprising:

(a) a hydraulic machine having a flow adjusting means and including at least a pumping function;

(b) a rotary machine operatively connected to said hydraulic machine and including at least a motor function for rotating said hydraulic machine;

(c) a frequency converter for driving said rotary machine; and

(d) a control system for controlling variable speed operation of said rotary machine according to a command signal from an external unit or a signal corresponding to the command signal,

(e) said control system including 1) an electric power control system for controlling the output of said rotary machine commensurate with the command signal, 2) a rotational speed control system for outputting a correction signal to said electric power control system in such a manner that said hydraulic machine is rotated at a correct rotational speed with respect to the command signal, and 3) a flow adjustment control system for controlling said flow adjusting means of said hydraulic machine in such a manner that an amount of opening of said flow adjusting means is commensurate with the command signal;

(f) said electric power control system having a small time constant which is negligible as compared to the time constant of said rotational speed control system;

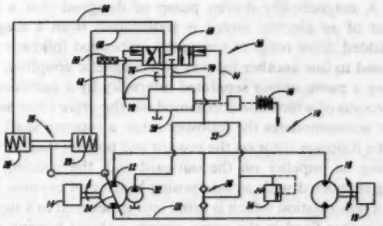
(g) at least one of said flow adjustment control system and said rotational speed control system having means for setting a transmission function in such a manner that, under normal operation conditions, a mechanical load of said hydraulic machine is not reduced while the rotational speed thereof is increasing, and that the mechanical load is not increased while the rotational speed is lowering.

5,160,245

DISPLACEMENT CONTROL FEEDBACK APPARATUS AND METHOD

Kerry Geringer, Ames, Iowa, assignor to Sauer, Inc., Ames, Iowa

Filed May 1, 1991, Ser. No. 694,345
Int. Cl.[5] F04B *49/00*; F16D *31/02*
U.S. Cl. 417—218 **6 Claims**



1. A feedback apparatus in a displacement control for a variable displacement hydraulic unit having a positionable swashplate, the displacement control including a valve spool axially movable within a valve body, the axial position of the valve spool operating to position the swashplate, the feedback apparatus comprising:

an elongated housing coupled with the swashplate and slidably mounted on the valve spool, the housing having an axially extending housing interior and spaced apart housing ends;

a pair of spring guides guided for axial movement and constrained between a pair of spaced stops on the valve spool;

spring means within the housing interior for biasing the spring guides outwardly into abutting relation with the opposite ends of the housing, the spring means being adapted to apply a predetermined level of preload force for outwardly biasing the spring guides into engagement with the stops on the valve spool such that positioning of the swashplate by the displacement control causes axial movement of the coupled housing along the valve spool to force one of the spring guides against a stop to cause axial movement of the valve spool;

means for varying the level of preload force developed by the spring;

each of the housing ends having an opening for receiving the valve spool, the openings in the housing ends defining an inwardly extending flange at each end thereof; each spring guide means comprising a sleeve coaxial with the valve spool and having an outwardly extending collar; and

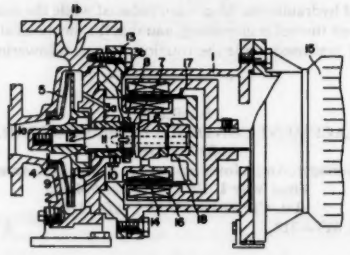
the inwardly extending flange at each end of the housing defining an opening therein, the outwardly extending collar on each spring guide engaging the flange to prevent movement of the spring guide through the opening when the spring guide sleeve is coaxially aligned with the valve spool.

5,160,246

MAGNETICALLY DRIVEN CYNTRIFICAL PUMP

Korejiro Horiuchi, Kobe, Japan, assignor to Sanwa Koki Co., Ltd., Nara, Japan

Continuation-in-part of Ser. No. 554,282, Jul. 17, 1990, abandoned. This application Jan. 8, 1991, Ser. No. 638,793
Claims priority, application Japan, Nov. 8, 1989, 1-130348[U]
Int. Cl.[5] F04B *35/04*
U.S. Cl. 417—365 4 Claims



1. A magnetically driven pump so designed that a drive power of an electric motor is transmitted from a magnets-embedded drive rotor to a magnets-embedded follower rotor opposed to one another by way of a magnetic coupling; comprising a pump casing separated internally by a partition into two rooms of which one accommodates the drive rotor and the other accommodates the follower rotor, a rotating shaft holding the follower rotor on the inward end portion thereof while holding an impeller on the outward end, the rotating shaft being supported with an interposing bearing of ceramic material of non-rotation which is fitted into an secured to a supporting member fixed in the pump casing, a thrust bearing of ceramic bearing being secured to the rotating shaft for integral rotation and juxtaposed in contact with said interposing bearing of non rotation so as to receive an axial load of the rotating shaft, a flange, for determining outward the position of the follower rotor, which is provided integrally on the rotating shaft at a predetermined position separated inwards from the thrust bearing, and a cushioning member being mounted on the rotating shaft in the position between the thrust bearing and said flange so as to positively push the thrust bearing continuously outwards from the rear against the interposing bearing of non-rotation, directly, whereby the rotational side thrust bearing can continue in contact with the interposing bearing of non-rotation without loosening.

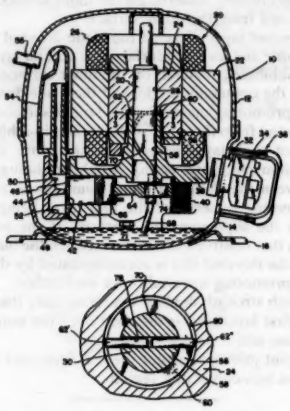
5,160,247

THRUST BEARING FOR REFRIGERATION COMPRESSOR

Tara C. Kandpal, Tecumseh, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Sep. 24, 1991, Ser. No. 764,885
Int. Cl.[5] F04B *35/04*
U.S. Cl. 417—415 16 Claims

1. A refrigeration compressor comprising:
a housing;
a cylinder block mounted within said housing and having a cylinder therein;
a piston reciprocatingly disposed within said cylinder;
a stator mounted on said cylinder block;
a bearing hub on said cylinder block defining a vertical bore, said bearing hub having an upper end face around said vertical bore;
a crankshaft means for reciprocating said piston in said cylinder, said crankshaft means journalled in said vertical bore and having an upper end extending upwardly above said bearing hub;
a rotor secured on said crankshaft upper end concentric with said stator; and



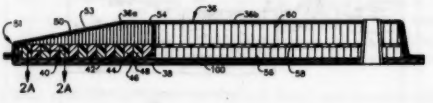
an elongate bearing extending transversely through said crankshaft means, said bearing being supported upon said end face.

5,160,248

FAN CASE LINER FOR A GAS TURBINE ENGINE WITH IMPROVED FOREIGN BODY IMPACT RESISTANCE

Jonathan P. Clarke, West Chester, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Feb. 25, 1991, Ser. No. 660,302
Int. Cl.[5] F01D *21/00*
U.S. Cl. 415—9 15 Claims



1. A fan case liner for a gas turbine engine, comprising:
a foreign body impact resistant area, including:
a face sheet including multiple plies of an impact resistant material which substantially resists plastic deformation when struck by a foreign body;
a first honeycombed layer disposed over and attached to said face sheet, said first honeycombed layer being made of one of aluminum and an aluminum alloy and having a multiplicity of hexagonally shaped cells formed therein, each of said cells having a selected width and a selected wall thickness to provide a selected compressive strength to resist plastic deformation of the fan case liner;
a microballoon filler material disposed within each of said cells of said first honeycombed layer to increase the compressive strength of said first layer and to distribute the forces caused by the impact of a foreign body to further resist plastic deformation of the fan case liner;
at least one second honeycombed layer disposed over and attached to said first honeycombed layer, said at least one second honeycombed layer being made of one of aluminum and an aluminum alloy and having a multiplicity of hexagonally shaped cells formed therein, each of said cells having a chosen width and a chosen wall thickness to provide a compressive strength greater than said selected compressive strength of said first honeycombed layer to

further distribute foreign body impact forces and to resist plastic deformation of the fan case liner; and

a backsheet disposed over and attached to said at least one second honeycombed layer.

15. A method for making a fan case liner for a gas turbine engine, comprising the steps of:

forming a face sheet of a first selected number of plies of fiberglass material;

forming a backsheet of a second selected number of plies of fiberglass material;

forming a first honeycombed layer made of one of aluminum and an aluminum alloy, the first layer having a multiplicity of hexagonally shaped cells formed therein, each of said cells having a selected width and wall thickness to provide a selected compressive strength;

filling the first honeycombed layer cells with a microballoon filler material to further increase the compressive strength of the first layer to prevent denting when impacted by a foreign body;

forming a second honeycombed layer made of one of aluminum and an aluminum alloy, the second honeycombed layer having a multiplicity of hexagonally shaped cells formed therein, each of said cells having a chosen width and a chosen wall thickness to provide a chosen compressive strength;

attaching the backsheet to one surface of the second honeycombed layer by an adhesive;

attaching an opposite surface of the second honeycombed layer to one surface of the first honeycombed layer by an adhesive; and

attaching the face sheet to an opposite surface of the first honeycombed layer by an adhesive.

5,160,249

CIRCUMFERENTIAL FLOW TYPE FUEL PUMP

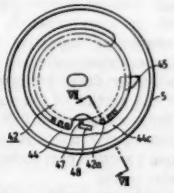
Shingo Iwai, and Hiroshi Yoshioka, both of Hiroshima, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 13, 1990, Ser. No. 611,505

Claims priority, application Japan, Nov. 17, 1989, 1-297478; Nov. 20, 1989, 1-134979; Feb. 16, 1990, 2-36682

Int. Cl.[5] F04D *5/00*

U.S. Cl. 415—55.3 **6 Claims**



1. A circumferential flow type fuel pump comprising:

an impeller having a periphery;

a circumferential fuel flow passage provided along the periphery of the impeller and having an inner wall, an outer wall having an upstream region and a downstream region distanced radially inward from the upstream region, and a gas discharging hole communicating between the inner wall and the outside of the pump, the fuel flow passage having a larger cross section along the upstream region than along the downstream region; and

a fuel guide recess extending to the gas discharging hole from a start point which is located slightly upstream of and on a radially outward side of the gas discharging hole and passes obliquely through the fuel flow passage.

5,160,250

VACUUM PUMP WITH A PERIPHERAL GROOVE PUMP UNIT

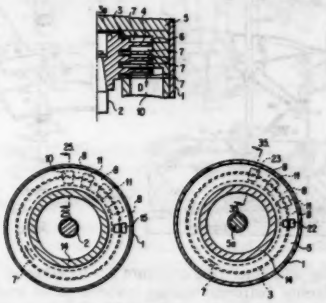
Tatsuji Ikegami; Tetsuro Ohbayashi; Keiichi Yoshida, all of Otori-Higashi, and Masashi Iguchi, Tokyo, all of Japan, assignors to Osaka Vacuum, Ltd., Osaka, Japan

Division of Ser. No. 582,783, Sep. 14, 1990, Pat. No. 5,074,747, which is a continuation of Ser. No. 379,072, Jul. 13, 1989, abandoned. This application Oct. 1, 1991, Ser. No. 769,463

Claims priority, application Japan, Jul. 13, 1988, 63-174148; Jul. 26, 1988, 63-186632; Aug. 17, 1988, 63-204128; Sep. 12, 1988, 63-226533; Dec. 16, 1988, 63-316227

Int. Cl.[5] F04D *19/04*

U.S. Cl. 415—90 **2 Claims**



1. A vacuum pump having a peripheral groove vacuum pump unit, which comprises:

a casing provided with an inlet port and an outlet port;

a turbomolecular pump unit disposed in an upper section of said casing with respect to a flow direction of the gas;

a peripheral groove vacuum unit disposed in a lower section of said casing, said unit comprising a rotor disposed within the casing; a rotor shaft journaled on the casing; a rotor body fixed to the rotor shaft and provided integrally with a plurality of rotor disks; a stator fixedly positioned within the casing and provided with a plurality of annular grooves respectively receiving peripheral portions of the rotor disks wherein both sides of the peripheral portion of each rotor disk form flow passages and a plurality of partitions project from the stator into the flow passages, wherein terminating ends of the flow passages for an upstream rotor disk on an outlet side of one of said peripheral portions communicate with starting end portions of the flow passages for a downstream rotor disk on an inlet side of said one of said partitions by connecting passage means and wherein said plurality of partitions and connection passage means are arranged at angular intervals.

5,160,251

LIGHTWEIGHT ENGINE TURBINE BEARING SUPPORT ASSEMBLY FOR WITHSTANDING RADIAL AND AXIAL LOADS

John J. Ciokajlo, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed May 13, 1991, Ser. No. 698,879

Int. Cl.[5] F01D *25/16*

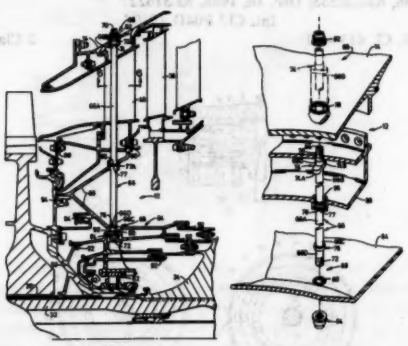
U.S. Cl. 415—142 **15 Claims**

1. In a gas turbine engine having a stationary outer annular casing, an inner annular bearing arrangement spaced radially inwardly from said outer casing, and a turbine rotor mounted by said inner annular bearing arrangement within said outer casing for rotation about a central axis relative to said outer casing and said inner bearing arrangement, a bearing support assembly, comprising:

(a) an inner ring structure extending about and mounting said inner annular bearing;

(b) a plurality of elongated tie rods each having opposite outer and inner end portions, said tie rods being disposed in circumferential spaced relation to one another and extending in radial relation to said central axis and between said outer casing and said inner ring structure;

(c) means for fixedly clamping said outer casing and inner ring structure respectively to said outer and inner end portions of said tie rods such that said tie rods, outer



casing and inner ring structure act together as a unit to uniformly distribute bearing-induced radial loads and to withstand bearing-induced radial loads in both tension and compression; and

(d) an annular shell structure disposed between and fixedly interconnecting said inner ring structure and said outer casing such that said annular structure, inner ring structure and outer casing act together as a unit to withstand axial loads induced by differences in air pressure existing axially through said outer casing.

5,160,252

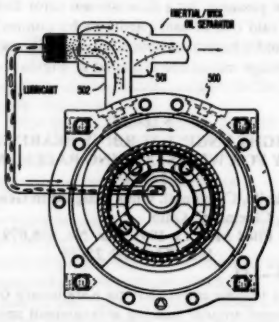
ROTARY VANE MACHINES WITH ANTI-FRICTION POSITIVE BI-AXIAL VANE MOTION CONTROLS

Thomas C. Edwards, 1426 Gleneagles Way, Rockledge, Fla. 32955

Continuation-in-part of Ser. No. 534,542, Jun. 7, 1990. This application Jun. 20, 1991, Ser. No. 718,560

Int. Cl.[5] F04C *2/344*

U.S. Cl. 418—1 **41 Claims**



1. A non-contact vane-type motor comprising a casing having an interior conjugate internal conforming profile, said casing being secured between two opposing endplates and having an inlet for high pressure fluid and an outlet for the fluid, each endplate having a circular annulus, said annuli being of substantially matching configuration, the center of each annulus being coincident with the geometric center of said interior conjugate internal conforming casing profile, a rotor mounted for rotation within said casing in a matching eccentric relationship with said interior internal conjugate conforming casing profile, said rotor being equipped with at least one substantially radially disposed slot containing a vane having an accurately configured tip maintained in an exceedingly close but non-contact relationship with said interior conjugate internal conforming profile and a pivotally-mounted tether having inner and outer peripheries at a location comparatively remote from said vane tip, anti-friction rollers operatively disposed at at least one interface of each annulus and the respective vane tethers such that at least a portion of each of said tethers engages said anti-friction rollers during operation of said motor, the annulus in each of said endplates thus serving as an effective guide for the respective tethers and tips of said vanes.

5,160,253

SCROLL TYPE FLUID APPARATUS HAVING SEALING MEMBER IN RECESS FORMING SUCTION SPACE

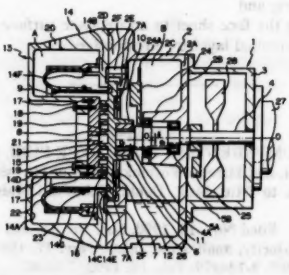
Hiroki Okada; Hiroshi Mitsuhashi, and Susumu Sakamoto, all of Kanagawa, Japan, assignors to Tokico Ltd., Kanagawa, Japan

Filed Jul. 17, 1991, Ser. No. 731,312

Claims priority, application Japan, Jul. 20, 1990, 2-192539

Int. Cl.[5] F01C *1/04, 19/00, 21/04*

U.S. Cl. 418—55.2 **4 Claims**



1. A scroll-type fluid apparatus comprising:

a casing including a casing body and an annular flange member,

said annular flange member comprising an outer generally cylindrical wall, an inner generally cylindrical wall, a bottom plate connecting respective end portions of said outer and said inner cylindrical walls to define an annular recess therewith, a first flange extending radially inwardly from the other end portion of the outer cylindrical wall, and a second flange extending radially inwardly from the other end portion of said inner cylindrical wall, and

said casing defining a suction port therein in communication with said annular recess;

a drive shaft rotatably supported in a journal of the casing and having a shaft portion extending through said casing body, said shaft portion including a crank;

an orbiting scroll member rotatably mounted on the crank through a bearing and including a mirror-finished plate and an orbiting scroll wrap which extends upright on the mirror-finished plate, said mirror-finished plate being slidably supported between said casing body and said first flange;

a sealing member including an outer flap and an inner flap and having a generally U-shaped cross section, said outer flap being connected to said first flange and said inner flap being connected to said mirror-finished plate of the orbiting scroll member, said sealing member defining a suction chamber in said annular space which communicates with

said suction port, and said sealing member sealing said suction chamber from the interior of said casing body in a fluid-tight manner;

a mirror-finished plate and a stationary scroll wrap extending upright thereon which are together discrete from said annular flange member and are securely mounted on said second flange so as to constitute a stationary scroll member with said annular flange member, said stationary scroll wrap engaged with the scroll wrap of said orbiting scroll member so as to define a sealed space therebetween, the mirror-finished plate of said stationary scroll member defining a discharge port therethrough communicating with said sealed space, and said second flange supporting said mirror-finished plate of the stationary scroll member only at the peripheral portion of said plate to define an opening at which a portion of said mirror-finished plate of the stationary scroll member is exposed to ambient air; and

means for supplying lubricant to where the mirror-finished plate of said orbiting scroll member is slidably supported between said casing body and said first flange.

5,160,254

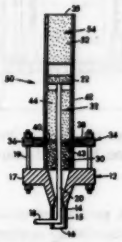
APPARATUS AND METHOD FOR COMBUSTION WITHIN POROUS MATRIX ELEMENTS

Ronald D. Bell; William C. Gardiner; John R. Howell; Ronald D. Matthews, and Steven P. Nichols, all of Austin, Tex., assignors to Radian Corporation and the Board of Regents and The University of Texas System, both of Austin, Tex.

Continuation-in-part of Ser. No. 554,748, Jul. 18, 1990, abandoned, and a continuation-in-part of Ser. No. 670,286, Mar. 15, 1991. This application Oct. 4, 1991, Ser. No. 771,660

Int. Cl.[5] F23D *14/16*

U.S. Cl. 431—7 **6 Claims**



1. Burner apparatus for controlled low NO_x combustion, comprising first and second combustion zones, each filled with a porous high temperature resistant matrix, the void spaces of which provide sites at which substantially all of said combustion occurs, said second zone being downstream of said first zone; means for mixing fuel and a gaseous source of oxygen and providing the resultant combustible mixture to the input end of said first combustion zone to establish fuel-lean conditions therein; and means for feeding the combustion products from said first zone to said second zone and augmenting same with further oxygen and sufficient additional fuel to create fuel-rich burning conditions therein to complete the oxidation of the products from said first zone; and cooling means mounted in proximity to said input end of said first combustion zone, for maintaining the temperature of said combustible mixture at said input end below ignition temperature thereby limiting the flame produced by combustion in said porous matrix to the downstream side of said cooling means, said means being mounted to be non-intrusive with respect to the interior of said porous matrix, thereby presenting no interference with the flow of said combustible mixture through said matrix.

5,160,255

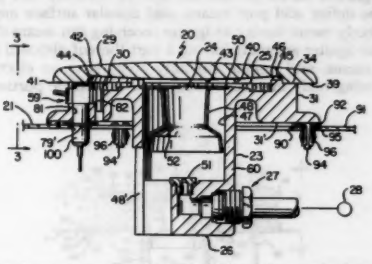
BURNER CONSTRUCTION AND IGNITER ASSEMBLY THEREFOR

Kent K. Sigler, Youngwood, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 759,217, Sep. 13, 1991, Pat. No. 5,112,218. This application Mar. 11, 1992, Ser. No. 850,336

Int. Cl.[5] F23Q *3/00*

U.S. Cl. 431—266 **18 Claims**



1. In a burner construction comprising a burner body means having a chamber means therein and having opposed end means one of which is open to said chamber means and the other of which has means for interconnecting a source of fuel to said chamber means, and a removable cap means closing said one end means of said body means, said burner construction having port means interconnecting said chamber means to the exterior of side burner construction and through which said fuel can issue to burn externally to said burner construction, said body means having an annular surface means interrupted by a plurality of radially disposed groove means that are space apart by land means of said annular surface means, said cap means having an annular surface means cooperating with said annular surface means of said body means to close said groove means on one end thereof whereby said groove means define said port means, said body means having an igniter receiving slot means therein, and an igniter assembly having a part thereof disposed in said slot means, said igniter assembly comprising an electrically insulating body member having an intermediate portion and having opposed end surface means one of which is disposed adjacent said cap means, and an electrically conductive L-shaped electrode means carried by said body member and having two legs one of which extends out of said intermediate portion thereof for sparking to said cap means and the other of which extends out of the other of said opposed end surface means of said insulating body member for electrical connection purposes, the improvement wherein said body member comprises a one-piece member and wherein said two legs of said electrode means initially comprised two separate part having adjacent end means that have now been secured together inside said body member, said end means of said two legs of said electrode means each comprising a side surface means and an end surface means that is disposed generally transverse to said side surface means thereof, one of said two legs having said end surface means thereof facing said side surface means of the other of said two legs.

5,160,256

BURNER CONSTRUCTION, IGNITER ASSEMBLY THEREFOR AND METHODS OF MAKING THE SAME

Fred Riehl, Greensburg, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

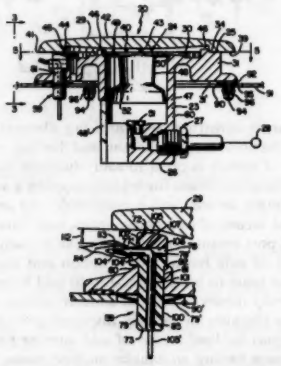
Filed Jul. 19, 1991, Ser. No. 732,600

Int. Cl.[5] F23Q *3/00*

U.S. Cl. 431—266 **20 Claims**

1. In a burner construction comprising a burner body means having a chamber means therein and having opposed end means one of which is open to said chamber means and the other of which has means for interconnecting a source of fuel to said chamber means, and a removable cap means closing

said one end means of said body means, said burner construction having port means interconnecting said chamber means to the exterior of said burner construction and through which said fuel can issue to burn externally to said burner construction, said body means having an annular surface means interrupted by a plurality of radially disposed groove means that are spaced apart by land means of said annular surface means, said cap means having an annular surface means cooperating with said annular surface means of said body means to close said groove means on one end thereof whereby said groove means define said port means, said annular surface means of said body means having an igniter receiving slot means therein, and an igniter assembly having a part thereof disposed in said slot means, said igniter assembly comprising an electrically insulating body member having an intermediate portion pro-



vided with a groove means therein and having opposed end surface means one of which is disposed adjacent said cap means, and an electrically conductive L-shaped electrode means carried by said body member and having two legs one of which has a first part thereof disposed in said groove means of said body member and has a second part extending out of said intermediate portion for sparking to said cap means, the improvement wherein said one end surface means has a part covering a part of said groove means to separate that said part of said groove means from said cap means and wherein said groove means of said body member leads from said chamber means to said second part of said one leg of said electrode means between said part of said one end surface means and said intermediate portion of said body member for feeding fuel from said chamber means to said second part of said one leg of said electrode means.

5,160,257

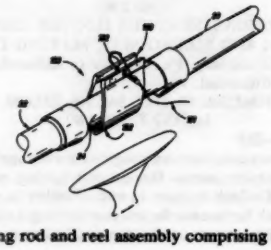
FISHING EQUIPMENT ANCHOR

Steven Tsengas, 7768 Litchfield Dr., Mentor, Ohio 44060

Filed Apr. 22, 1991, Ser. No. 689,153

Int. Cl.[5] A01K *97/16*

U.S. Cl. 43—25 **8 Claims**



1. A fishing rod and reel assembly comprising a rod having a reel mounting location, a reel comprising a reel mounting shoe detachably secured to said reel mounting location, and a fishing equipment loss preventive anchor, the anchor comprising:

a) a body secured to said assembly, said body comprising a body portion extending between said reel mounting location and said mounting shoe;

b) connecting means connected to said body for securing said anchor and preventing loss of said assembly; and,

c) wherein said body portion comprises a thin elongated strip of stiffly resilient material and movement limiting structure for engaging said assembly and maintaining said body portion positioned between said reel and said rod when the body portion might otherwise be dislodged, said movement limiting structure comprising first and second abutments disposed at opposite ends of said body portion, said abutments being thicker than said body portion and projecting therefrom for engagement with said assembly.

5,160,258

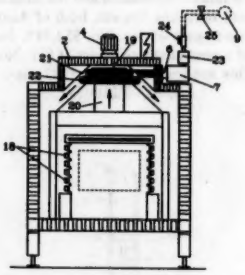
DEVICE AT A HEAT TREATMENT OVEN

Lars Karlsson, Onsala, Sweden, assignor to Triline AB, Molndal, Sweden

Filed Sep. 26, 1990, Ser. No. 588,347

Int. Cl.[5] F27B *9/04*

U.S. Cl. 432—152 **5 Claims**



1. A device at a heat treatment oven of the type using a combination of radiation heat and convection heat, comprising:

an oven chamber;

a circulation channel, positioned outside the oven chamber;

means arranged for circulating atmosphere of the heat treatment oven through the oven chamber and the circulation channel and back to the oven chamber;

a single vessel positioned in the circulation channel to exchange heat with the oven atmosphere in the circulation channel and to allow combustion therein, the vessel being designed as a tubular channel comprising a coiled, corrugated tube; and

a gas burner arranged at combustion to emit its flame directly into the vessel such that the direction of the flame at least partly coincides with the circulation channel.

5,160,259

DRAFT CONTROL METHOD AND APPARATUS FOR MATERIAL PROCESSING PLANTS

John O'Hara, Annville; Fred L. Fuhrman, Jonestown; David R. Wolfe, Lititz, and Bruce C. Irwin, Palmyra, all of Pa., assignors to Hauck Manufacturing Company, Lebanon, Pa.

Filed May 1, 1991, Ser. No. 694,257

Int. Cl.[5] F27B *9/40*; F23N *5/00*

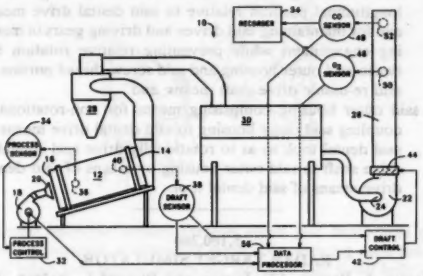
U.S. Cl. 432—37 **11 Claims**

1. The method for processing material in which the combustion products of fuel supplied to a burner are drawn by induced draft into heat exchange relation with the material being pro-

cessed and exhausted as stack gases, the rate of fuel supply to the burner being determined by a burner set point corresponding to heat required for processing the material, said method comprising the steps of:

modulating the burner set point as required for processing the material;

monitoring the oxygen content of the stack gases;



monitoring the air pollutant content of the stack gases in relation to the monitored oxygen content; and

varying the draft between minimum and maximum values for a given burner set point when the air pollutant content of the stack gases exceeds a predetermined maximum limit.

5,160,260

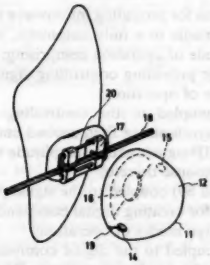
ESTHETIC BRACKET PROTECTOR

Cheng-Tsung Chang, No. 21-2, Lane 51, Po-ai Street, Tamsui Town, Taipei, Taiwan

Filed Oct. 10, 1991, Ser. No. 775,697

Int. Cl.[5] A61C *3/00*

U.S. Cl. 433—8 **1 Claim**



1. A bracket protector to be placed over an orthodontic bracket, said bracket having a wire, said protector consisting of a round-shaped hollow body, a covering, said covering having two orifices and two slits formed in two opposite sides of said covering said covering having an inner surface and an opening formed in said inner surface, the improvement which comprises:

each said orifice having a slit extending from each said orifice to a base of said covering, each said slit communicating each said orifice formed in each side of said covering and said opening formed in said inner surface of said covering, whereby upon a pressing of said protector on said bracket, said wire will be locked in said two orifices of said covering through said two slits for securing said protector on said bracket.

5,160,261

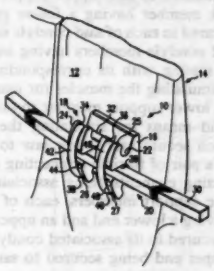
ORTHODONTIC BRACKET AND METHOD

Jeffrey A. Peterson, Aurora, Colo., assignor to RMO, Inc., Denver, Colo.

Filed May 20, 1991, Ser. No. 702,943

Int. Cl.[5] A61C *3/00*

U.S. Cl. 433—8 **36 Claims**



1. An improved edgewise orthodontic bracket of the type having a base for attachment to a tooth and at least one pair of tie wings extending therefrom, said at least one pair of tie wings defining a mesiodistal slot having a support floor surface for receiving an orthodontic archwire, wherein the improvement comprises:

an occlusally facing notch and a gingivally facing notch on a periphery of said at least one pair of tie wings, wherein each of said notches of said at least one pair of tie wings is adapted for receiving a device for retaining the archwire in said slot, slopes upwardly from said periphery through at least a portion of one of said tie wings toward said slot, and has laterally displaced sidewall portions and a bottom portion which define a substantially arcuate surface, and wherein undesired frictional contact between the archwire and said device for retaining may be selectively reduced.

5,160,262

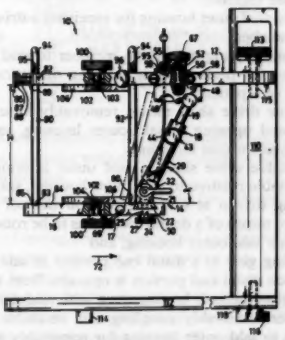
DENTAL ARTICULATOR

Michael C. Alpern, Charlotte; Ralph J. Brandon, Punta Gorda, and Douglas G. Nuelle, Port Charlotte, all of Fla., assignors to Ormco Corporation, Glendora, Calif.

Filed Feb. 5, 1991, Ser. No. 650,874

Int. Cl.[5] A61C *11/00*

U.S. Cl. 433—58 **27 Claims**



1. A dental articulator comprising:

an upper support member for supporting a first dental cast, orthodontic model or other dental device;

a lower support member having a base member for support-

ing a second dental cast, orthodontic model or other dental device and a pair of axially spaced condyle support members extending therefrom towards said upper support member;

polycentric hinge joint means for simulating the temporomandibular condylar joint and for mounting said lower support member to said upper support member, said polycentric hinge joint means comprising a pair of fossae block members mounted to said upper support member, each fossae block member having a fossae recess, a condyle member secured to each of said condyle support members, each of said condyle members having an outer engaging surface for mating with its corresponding fossae recess, means for simulating the muscles for mastication and for biasing said lower support member to said upper support member, and means for simulating the ligaments of a patient which secure said lower jaw to said upper jaw comprising a pair of flexible connecting elements, one of said connecting elements being associated with each of said condyle support members, each of said connecting elements having a lower end and an upper end, said lower end being secured to its associated condyle support member, said upper end being secured to said upper support member.

5,160,263

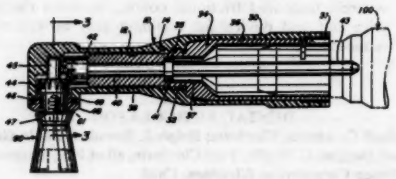
DISPOSABLE RIGHT ANGLE DENTAL HANDPIECE

Moshe Meller, 175 Oberlin Ave., Lakewood, N.J. 08701, and Michael Feldman, Howell, N.J., assignors to Moshe Meller, Lakewood, N.J.

Continuation of Ser. No. 502,454, Mar. 30, 1990, Pat. No. 5,007,832. This application Apr. 10, 1991, Ser. No. 683,251 The portion of the term of this patent subsequent to Apr. 16, 2008, has been disclaimed.

Int. Cl.[5] A61C *1/08*

U.S. Cl. 433—125 **14 Claims**



1. A disposable dental handpiece comprising:

an outer housing made of a disposable molded plastic material and having an elongated opening therein for receiving a drive shaft means, said outer housing being disposable after use thereof;

a cavity in said outer housing for receiving a driven rotatable gear member;

means for coupling a working member to said driven gear member for performing a working operation in an oral cavity of a patient;

a re-usable drive shaft means removably mounted in said elongated opening in said outer housing, said re-usable drive shaft means including:

a rotatable drive shaft in said outer housing and being rotatable relative to said outer housing, said drive shaft being driven at one end portion thereof by a dental drive means of a dental tool, so as to be rotatably driven within said outer housing; and

a driving gear at a distal end portion of said drive shaft, which distal end portion is opposite from said one end portion thereof, for engaging with said driven gear;

means for removably coupling said re-usable drive shaft means to said outer housing for removably securing said re-usable drive shaft means in said elongated opening of said outer housing such that said driving gear is in engagement with said driven gear during use, and for permitting disengagement of said re-usable drive shaft means from said outer housing for disposal of said outer housing, said removably coupling means not penetrating through said outer housing, and including an external screw thread portion on said re-usable drive shaft means which is threadably engageable with a mating internal screw thread portion inside of said cavity in said outer housing to permit threaded engagement and disengagement of said re-usable drive shaft means from said outer housing and for maintaining said drive shaft and outer housing in fixed longitudinal position relative to said dental drive means and for maintaining said driven and driving gears in meshing engagement while preventing relative rotation between said outer housing and said screw thread portion of said re-usable drive shaft means; and

said outer housing comprising means for non-rotationally coupling said outer housing to said dental drive means of said dental tool, so as to rotationally drive said rotatable drive shaft in said outer housing by means of said dental drive means of said dental tool.

5,160,264

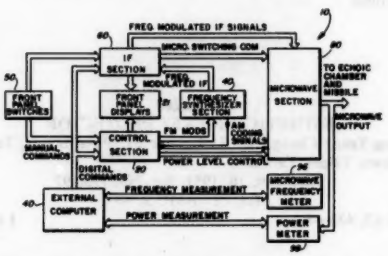
RADAR TARGET SIMULATOR

George A. Banura, 621 Joyner, and Richard L. Noland, 441 Cheyenne Cr., both of, Ridgecrest, Calif. 93555

Filed Dec. 31, 1984, Ser. No. 687,882

Int. Cl.[5] G01S *7/40*

U.S. Cl. 434—2 **7 Claims**



1. An apparatus for providing microwave signals to simulate a target for a missile in a fully automatic, semi-automatic or fully manual mode of operation comprising:

means (20) for providing controlling signals representative of the mode of operation;

means (40) coupled to the controlling signal providing means for synthesizing first, second and third frequency modulated IF signals and an amplitude modulated coding signal in response thereto;

means (40' and 50) coupled to the signal providing controlling means for creating digital command signals representative of three modes of operation;

means (60) coupled to the digital command signal creating means and the synthesizing means for storing the command signals and for extracting Doppler frequencies in both AC and DC forms from the synthesized first, second and third frequency modulated IF signals; and

means (80) coupled to the command signal storing and Doppler frequency extracting means and the controlling signal providing means for generating microwave signals to simulate the missile.

5,160,265

BEAUTY KIT FOR AID IN HAIRSTYLE SELECTION

Jin S. Kim, 151-70 24th Rd., Whitestone, N.Y. 11357

Filed Jul. 1, 1991, Ser. No. 723,406

Int. Cl.[5] G09B *19/10*

U.S. Cl. 434—94 **2 Claims**

1. A hair piece selection kit for aiding a person in the selec-

tion of a desired hairstyle comprising a plurality of generally square-shaped flat members, a facial hole cut generally centrally in said flat members, each of said flat members having a

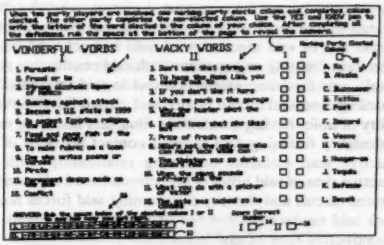
different hairstyle printed thereon about said facial hole to depict a hairstyle, a reflective surface for viewing each hairstyle when said person inserts the face into said facial hole to view said hairstyle.

5,160,266

MIX AND MATCH INVISIBLE INK GAME

Thomas J. Landis, New Albany, Ind., assignor to Stry-Lenkoff Company, Louisville, Ky.

Filed Feb. 11, 1991, Ser. No. 653,729
Int. Cl.[5] G09B 3/02
U.S. Cl. 434—328 **18 Claims**



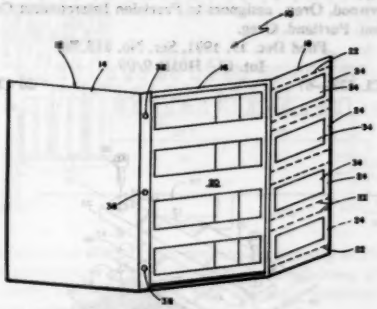
1. A learning association game comprising: at least one marking sheet; a color changing chemical marking means for marking said sheet visibly; a first series of differing visible images marked on said sheet each in the form of at least a portion of a positive statement, said series of statements being arranged in a first preselected arranged sequence; a second series of differing visible images marked on said sheet, each image thereof logically corresponding to at least one of substantially the entirety of said first series of differing visible image statements with the quantity of images in said first and second series being substantially equal, said second series of differing visible images being in a second preselected arranged sequence different from said first preselected sequence with each of substantially all images of one of said series being logically related to at least one of substantially all of the other of said series; visibly marked identifying indicia for each of the differing visible images of both of said series of visible images; a single visibly marked response area for each of the differing visible images of one of said series of visible images to allow the insertion therein with said marking means of a specific identifying indicia selected as the logically corresponding image of said other series; and, a separate answer confirmation area visibly outlined on said sheet which sets forth visibly the identifying indicia for each image of said one visible identifying series and invisibly the correct answer from the visible identifying indicia association with the other series to be developed visibly by said marking means to verify the correctness of the answers marked in said response areas.

5,160,267

PROGRAMMED LEARNING DEVICE

James S. Drake, 112 Knollwood Ct., Goodlettsville, Tenn. 37072

Filed Oct. 3, 1991, Ser. No. 770,853
Int. Cl.[5] G09B 3/00
U.S. Cl. 434—349 **12 Claims**



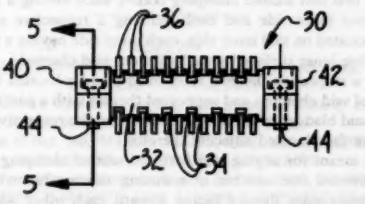
1. A programmed learning device comprising:
a. a folder having a backing and a leaf;
b. an information sheet releasably attached to said backing;
c. said leaf having at least one window and track means;
d. a masking slide slidably received by said track means, said slide having an opaque section for covering a portion of said information sheet exposed by said windows; and
e. an erasure sheet placed over said information sheet.

5,160,268

FLOATING STACKABLE CONNECTOR

Mohammad Hakamian, San Diego, Calif., assignor to Teledyne Kinetics, San Diego, Calif.

Filed Oct. 31, 1991, Ser. No. 786,053
Int. Cl.[5] H01R 9/09
U.S. Cl. 439—66 **13 Claims**



1. An electrical connector for connecting electrical components of a first substrate with electrical components of a second substrate, comprising:
an elongated insulator block having two generally parallel sides;
a plurality of spring contacts mounted to the insulator block each having a contact end extending past a side of the insulator block;
float mounting means for mounting the insulator block on the first substrate with the contact ends on a first side of the insulator block contacting the first substrate and with the contact ends on a second side of the insulator block contacting the second substrate and with the insulator block free to move between the substrates said float mounting means comprising an insert movably mounted

within an opening in the insulator block for attachment to a fastener attached to one of the substrates.

5,160,269

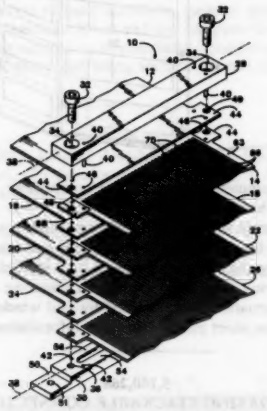
HYDROSTATIC CONNECTOR FOR FLEX CIRCUITS

Roy W. Fox, Jr., Williston, Vt.; Scott S. Corbett, III, Portland, Oreg.; David F. Miller, Aloha, Oreg., and Laurence A. Daane, Sherwood, Oreg., assignors to Precision Interconnect Corporation, Portland, Oreg.

Filed Dec. 19, 1991, Ser. No. 813,288

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—67 **20 Claims**



1. Apparatus for interconnecting respective pluralities of electrical conductors, comprising:

(a) at least one pair of conductor-carrying elements, each said conductor-carrying element including a respective flexible substrate and a respective plurality of conductor traces located spaced apart from each other thereon;

(b) first and second clamping bodies, each having a respective inner side and each defining a respective channel located on said inner side, each inner side having a respective inner surface located adjacent said channel;

(c) a respective flexible, fluid-filled bladder located in each of said channels and supported therein with a part of each said bladder being protuberant above the respective inner surface located adjacent thereto;

(d) means for urging said first and second clamping bodies toward one another in a mating relationship with said inner sides thereof facing toward each other with said conductor-carrying elements held therebetween;

(e) alignment means located between said first and second clamping bodies, for holding all of said conductor-carrying elements in respective predetermined positions relative to one of said first and second clamping bodies, and for holding both conductor-carrying elements of each pair so that corresponding ones of said conductor traces are in confronting registration with each other;

(f) said conductor-carrying elements having a combined thickness of said substrate and said conductor traces; and

(g) said alignment means including an alignment portion included in each of said conductor-carrying elements, said alignment portion having a thickness equal to said combined thickness of said substrate and said conductor traces.

5,160,270

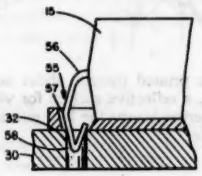
INTEGRATED CIRCUIT PACKAGES USING TAPERED SPRING CONTACT LEADS FOR DIRECT MOUNTING TO CIRCUIT BOARDS

Welles K. Raymond, Waterbury, Conn., assignor to General DataComm, Inc., Middlebury, Conn.

Continuation-in-part of Ser. No. 605,521, Oct. 29, 1990, and a continuation-in-part of Ser. No. 605,523, Oct. 29, 1990, and a continuation-in-part of Ser. No. 605,522, Oct. 29, 1990, abandoned, said Ser. No. 605,521, is a continuation of Ser. No. 366,546, Jun. 13, 1989, Pat. No. 4,966,556, said Ser. No. 605,523, and Ser. No. 605,522, is a continuation-in-part of Ser. No. 336,546,. This application May 8, 1991, Ser. No. 697,201

Int. Cl.[5] H05K *1/00*

U.S. Cl. 439—70 **22 Claims**



1. In combination, an integrated circuit package and a fastening means, said integrated circuit package having an integrated circuit and a plurality of conductive lead elements, first ends of said conductive lead elements being coupled to said integrated circuit, wherein each of said conductive lead elements further comprises a resilient tapered contact portion for extending partially into a hole of a circuit board and for resiliently engaging and mating with a conductive rim of said hole of said circuit board adjacent said integrated circuit, whereby forces generated by the resilient engagement of said contact portion with said rim of said circuit board tend to back said contact portion out of mating engagement with said conductive rim of said hole, said fastening means coupled to said integrated circuit package and said circuit board, said circuit board having a plurality of holes having conductive rims, said fastening means for releasably fastening said tapered contact portions of said conductive lead elements in mating relationship with said conductive rims of said holes of said circuit board adjacent said integrated circuit and thereby overcoming said forces tending to back said contact portion out of mating engagement with said conductive rims of said holes.

5,160,271

ADJUSTABLE TELEPHONE INTERFACE MOUNTING CLAMP

George J. Franks, Jr., 127 Duntrune, Inverness, Ill. 60067

Continuation-in-part of Ser. No. 679,895, Apr. 3, 1991, Pat. No. 5,114,895, which is a continuation-in-part of Ser. No. 320,360, Mar. 8, 1989, Pat. No. 5,006,074, which is a continuation-in-part of Ser. No. 204,397, Jun. 9, 1988, Pat. No. 4,993,960, which is a continuation-in-part of Ser. No. 116,899, Nov. 5, 1987, Pat. No. 4,828,504. This application Sep. 26, 1991, Ser. No. 766,598

Int. Cl.[5] H01R *4/66*

U.S. Cl. 439—92 **26 Claims**

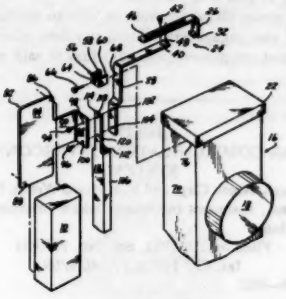
1. An adjustable width clamp for mounting a telephone interface box to a utility box having a width within a specified range, comprising:

an adjustable width elongated base adjustable for spanning the width range of the utility box, the base comprising first and second elongated members movable with respect to each other for adjusting the width of the base;

a pair of spaced apart arms extending from the base for positioning the arms adjacent opposite sides of the utility box, with each of the arms being engageable with its adjacent side of the utility box;

adjustment means for adjusting the width of said base to a

width slightly greater than the width of the utility box and for fixing the clamp at a desired width, said adjustment means including a plurality of spaced apart overlapping apertures in said first elongated member and at least one



aperture in said second elongated member selectively alignable with each of said overlapping apertures;

means for securing the clamp to the utility box; and

means for securing the telephone interface box to the clamp.

5,160,272

BACKPLANE WIRING

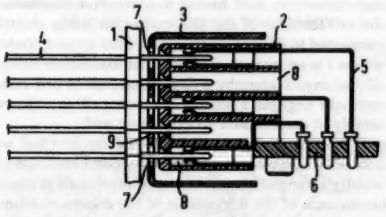
Karl Zell, Niederpoecking, and Guenter Thom, Gauting, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Sep. 10, 1991, Ser. No. 757,293

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1990, 9012949[U]

Int. Cl.[5] H01R *13/648*

U.S. Cl. 439—101 **5 Claims**



1. A backplane wiring system, comprising:

at least one plug device having receptacle chamber means with contact springs for plugging onto contact blades of a wiring backplane, the plug device being rigidly connected to a respective PC board;

a metallic shielding housing means which accepts the plug device and which is open at one side and which can be slipped onto the contact blades such that at least one of the contact blades is rigidly connected to the shielding housing means via an aperture which press fits against the contact blade whereas remaining contact blades project through apertures into the shielding housing means and are not electrically connected thereto; and

the receptacle chamber means of the plug device into which projects the contact blade which is rigidly connected to the sheilding housing means is not occupied with one of the contact spring.

5,160,273

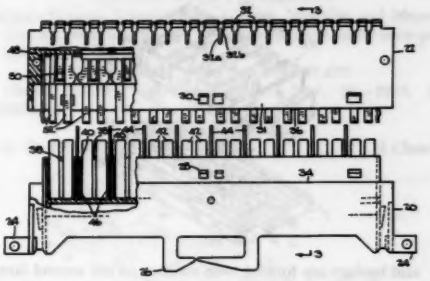
CONNECTOR BLOCK ASSEMBLY

William V. Carney, Oyster Bay, N.Y., assignor to Porta Systems Corp., Syosset, N.Y.

Filed Jun. 24, 1991, Ser. No. 719,939

Int. Cl.[5] H01R *13/648*

U.S. Cl. 439—108 **19 Claims**



1. A connector assembly for providing a plurality of closely spaced connections to mutually adjacent conductors which, respectively, conduct different high frequency electrical signals, said connector assembly comprising:

an elongated insulative block,

a plurality of connector elements mounted in closely spaced arrangement within said block,

said block being formed with openings providing access for said mutually adjacent conductors to be connected to the ends of corresponding mutually adjacent ones of said connector elements, whereby said mutually adjacent ones of said connector elements conductor said different high frequency signals,

said mutually adjacent connector elements having projected areas extending toward each other,

electrically conductive shields mounted within said block between said mutually adjacent connector elements to prevent crosstalk between said connector elements,

said shields each having a surface area extending over the entire projected area between said mutually adjacent connector elements, and

a conductive strip extending along the length of said block and contacting said shields.

5,160,274

BRANCH JUNCTION BOX AND BUSBARS FOR BRANCH CONNECTION

Keiichi Ozaki; Katsuaki Terada, and Shinobu Tahara, all of Kosai, Japan, assignors to Yazaki, Tokyo, Japan

Division of Ser. No. 641,423, Jan. 15, 1991, abandoned. This application Mar. 2, 1992, Ser. No. 841,778

Claims priority, application Japan, Jan. 16, 1990, 2-1628[U]; May 2, 1990, 2-46660[U]; Oct. 1, 1990, 2-102253[U]; Oct. 1, 1990, 2-102255[U]; Nov. 6, 1990, 2-115935[U]

Int. Cl.[5] H01R *9/24*

U.S. Cl. 439—212 **1 Claim**

1. A branch junction box comprising:

an upper case and a lower case;

a plurality of connector insertion portions provided on the upper case;

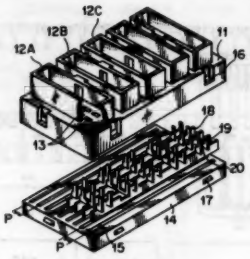
a plurality of parallel busbar accommodating grooves formed in the lower case at equal intervals; and

a plurality of busbars each having one lateral edge thereof installed in a respective busbar accommodating groove and, at the other lateral edge, having branched tabs projected upwardly therefrom through tab connection portions into the connector insertion portions;

said tab connecting portions each consisting of: a rising piece extending upwardly from the second lateral edge of the

busbar; and a tab connecting piece extending laterally on one side or both sides of the rising piece;

said tab connecting pieces are bent at right angles to the plane of the busbar so that the branched tabs on said connecting pieces will protrude sideways from the busbar, and extended portions of the tab connecting pieces are formed with the upwardly projecting branched tabs;



said busbars are formed with notches on the second lateral edge where the extended portion of the tab connecting piece of one busbar is closest to an adjacent busbar, and the notches and the tab connecting pieces facing the notches are each provided with a folded piece in order to prevent current leaks.

5,160,275

ELECTRICAL CONNECTOR FOR CIRCUIT BOARDS

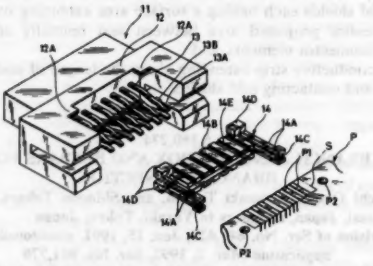
Masaru Nakamura; Kouzou Uekido, and Tsunekazu Ukai, all of Tokyo, Japan, assignors to Hirose Electric Co., Ltd., Tokyo, Japan

Filed Jul. 23, 1991, Ser. No. 734,625

Claims priority, application Japan, Sep. 6, 1990, 2-93176; Oct. 16, 1990, 2-107668

Int. Cl.[5] H01R *13/62*

U.S. Cl. 439—328 **7 Claims**



1. In an electrical connector for receiving a circuit board and have contacts for coming into resilient pressured contact with circuit portions of the circuit board, said contacts and said circuit portions adapted to be soldered together by heating cream solder that was applied to said circuit portions of the circuit board prior to said connector receiving said edge portion of the circuit boards,

said connector including an insulating housing with said contacts mounted in a said housing in cantilevered state, each contact including an intermediate portion extending in a first direction when it engages said circuit portion of the circuit board,

the improvement comprising an insulating frame for receiving said edge of said circuit board, said frame and edge of the circuit board being insertable into said connector housing until said contacts engage said circuit portion,

said frame being insertable into said housing to a first position, the edge of the board then being insertable into said frame, said frame with said board being further insertable into said housing to a second portion,

said frame further comprising first means for elastically deflecting said contacts in a second direction transverse of the first direction when said frame is inserted into said housing to said first position,

said first means allowing said contacts to resiliently return toward and engage said circuit portions when said fame and board are moved from said first to said second position.

5,160,276

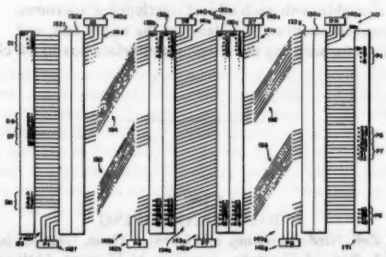
MODULAR COMMUNICATION INTERCONNECTION SYSTEM

John K. Marsh, Rome City, and V. Richard Welch, Fort Wayne, both of Ind., assignors to Group Dekko International, Kendallville, Ind.

Filed Jul. 9, 1991, Ser. No. 727,481

Int. Cl.[5] H01R *11/00, 9/09*

U.S. Cl. 439—502 **18 Claims**



1. A wiring arrangement for providing communication channels to a plurality of workstations, the wiring arrangement comprising

a plurality of communication connectors, each having respectively n terminals, at each of the plurality of workstations;

a plurality of modular assemblies comprising first and second connectors, each having m connection terminals, with the m^{th} terminal of the first connector being electrically connected to the $m^{th}+i$ terminal of the second connector, where i is an integer, said modular assemblies being serially arranged whereby a first connector of one assembly matingly engages a second connector of an adjacent assembly at each of said workstations; and

means for connecting the terminals of the first and second connectors on respective first and second free ends of said serially arranged assemblies to communication channels;

wherein each of the n terminals of the communication connectors is connected to an m^{th} terminal of the first and second connectors at the workstations to provide each of the plurality of workstations access to the communication channels.

5,160,277

SNAP-IN LAMP FOR PRINTED CIRCUITS

James J. Fitzgerald, Boontown, N.J., and Marvin L. Owen, Grand Blanc, Mich., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Apr. 4, 1990, Ser. No. 504,467

Int. Cl.[5] H01R *13/73*

U.S. Cl. 439—554 **25 Claims**

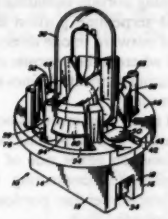
1. An assembly for receiving a lamp to mount the lamp onto a printed circuit board or panel having an aperture with opposed arcuate sections and opposed slots, comprising:

a socket having an aperture for receiving the lamp and

having a support surface for engaging one side of the circuit board or panel;

at least one member projecting from said support surface and being deflectable between a deflected position and a normal position, said member having a shoulder which is substantially parallel to said support surface, the distance between said shoulder and said support surface being greater than the thickness of the circuit board or panel upon mounting the lamp onto the circuit board or panel;

said shoulder having an unaligned position for receiving an edge of an arcuate section of the circuit board or panel between said shoulder and said support surface thereby mounting said socket onto the circuit board or panel and



an aligned position for releasing the edge of the arcuate section of the circuit board or panel to allow removal of said socket from the circuit board or panel;

alignment means disposed on said socket and receivable within the slots for aligning said socket with the aperture in said unaligned position;

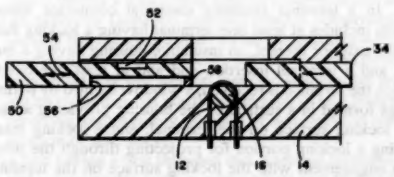
said unaligned position of said shoulder being achieved by moving said member first to said deflected position upon the insertion of said socket into the aperture of the circuit board or panel and then to said normal position after said member has been inserted, said aligned position being achieved by the rotation of said socket within the aperture of the circuit board or panel until said member is aligned with one of the opposed slots.

5,160,278

REAGENT STRIP CALIBRATION SYSTEM

Larry D. Johnson, Mill Creek, Ind., assignor to Miles Inc., Elkhart, Ind.

Filed Oct. 22, 1990, Ser. No. 600,906
Int. Cl.[5] H01R *13/00*
U.S. Cl. 439—593 **8 Claims**



1. A reagent strip calibration system comprising

a) a one-time use reagent strip having areas of differing resistance, and

b) a connector usable for contacting said one-time use reagent strip by physical displacement composed of

a base,

an elongated resilient member disposed on said base,

a plurality of generally U-shaped, nonresilient, hard, electrically conductive wires disposed in a substantially parallel relationship about said elongated elastomeric member and supported thereby, and

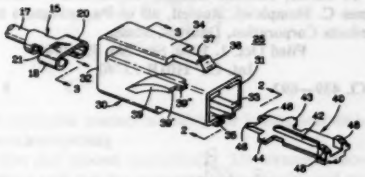
means defining a completely open cavity adjacent said conductive wires for receiving said one-time use reagent strip, said cavity being dimensioned so that said one-time use reagent strip compresses said nonresilient, hard, electrically conductive wires when the one-time use reagent strip is inserted into said cavity causing said wires to become biased against said one-time use reagent strip.

5,160,279

DOUBLE LOCK CONNECTOR

Tetsuya Sagawa, Yamato; Koji Aoyama, Machida, and Muneo Oshima, Yokohama, all of Japan, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 22, 1991, Ser. No. 797,497
Claims priority, application Japan, Nov. 26, 1990, 2-122456[U]
Int. Cl.[5] H01R *13/40*
U.S. Cl. 439—595 **14 Claims**



1. An electrical connector housing for securing an electrical contact therein, comprising:

a dielectric housing having a contact-receiving passage along which the electrical contact is to be disposed;

an integral lance extending from a surface of said housing and positioned within said contact-receiving passage for engagement with the electrical contact when positioned in said contact-receiving passage to maintain the electrical contact therein;

a lance-engaging member having a plate section insertable into said contact-receiving passage;

a first latch on said plate section and an interior surface of the contact-receiving passage of said housing and being in the same plane as that of said plate section maintaining said lance-engaging member at a first position in said contact-receiving passage to enable the electrical contact to be positioned within the contact-receiving passage so that said lance engages the electrical contact to maintain it therein; and

a second latch on said plate section and an interior surface of the contact-receiving passage of said housing and being in the same plane as that of said plate section maintaining said lance-engaging member at a second position within said contact-receiving passage with said plate section engaging said lance to maintain said lance in engagement with the electrical contact thereby securing the electrical contact in the contact-receiving passage.

5,160,280

ELECTRONIC PLUG

Tung-Hsien Chuang, No. 752, Min Tsu 1rd Rd., Kaohsiung City, Taiwan

Filed Nov. 13, 1991, Ser. No. 791,144
Int. Cl.[5] H01R *13/00*
U.S. Cl. 439—675 **3 Claims**

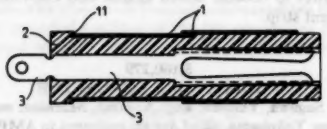
1. An electronic plug comprising:

an outer metal tube having first and second ends, said outer tube being formed from two separate metal tubes having different internal diameters and which are fixedly secured together;

an insulator fixedly secured within said outer metal tube, said insulator projecting beyond both of said first and second ends of said outer tube; and

a single conductive member fixedly secured within said

insulator, said conductive member having a first terminal end projecting out of said insulator and adapted to be



connected to a wire and a second end, said second end being forked and terminating within said insulator.

5,160,281

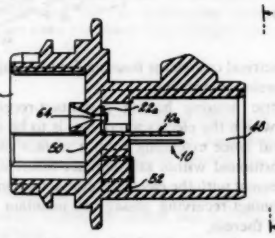
AUTOMOTIVE HEADLAMP SOCKET

John F. Culver, Russell; Douglas G. Seymour, Warren, and James C. Humphrey, Russell, all of Pa., assignors to GTE Products Corporation, Danvers, Mass.

Filed Oct. 1, 1990, Ser. No. 591,194

Int. Cl.[5] H01R *13/40*

U.S. Cl. 439—692 **3 Claims**



1. A lamp socket comprising an elongated body with a longitudinal axis and having a first, hollow, lamp receiving end and a second, hollow, plug receiving end; a transverse floor extending across said body and separating said first end from said second end; a transverse wall projecting from said floor into said second end, said wall having a plurality of electrical contact receiving means therein.

5,160,282

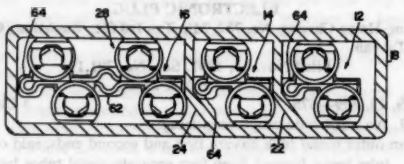
HIGH DENSITY CONNECTOR MODULE

John D. Swaffield, Woburn, and John T. Doyle, Danvers, both of Mass., assignors to Precission Connector Devices, Inc., Peabody, Mass.

Continuation of Ser. No. 794,798, Nov. 19, 1991, abandoned, which is a continuation of Ser. No. 672,776, Mar. 20, 1991, abandoned, which is a continuation of Ser. No. 429,194, Oct. 27, 1989, abandoned. This application Apr. 1, 1992, Ser. No. 863,368

Int. Cl.[5] H01R *9/22*

U.S. Cl. 439—721 **11 Claims**



1. A connector module for electrically connecting and mechanically retaining a plurality of contact pins comprising, in combination:

(a) housing means, made of electrically insulating material, defining at least one recess;

(b) metal strip means defining a series of electrically conductive contacts, each metal strip means being positioned within each housing means recess, said metal strip means being constructed of one piece and including:

(i) means defining a plurality of integral contact mating elements, each constructed and arranged to receive one contact pin, including means defining a mating element retainer portion configured to mechanically retain the contact pin, and means defining a mating element electrical connection portion configured to engage the contact pin to provide an electrical connection between the pin and the mating element,

(ii) electrically conductive joining portions between adjacent integral contact mating element means with at least one such joining portion including a serpentine portion, wherein said serpentine portion and said mating elements extend outward in one direction from the joining portion, and wherein the opposite side of the outwardly extending mating elements defines a back surface of said metal strip means,

and wherein said metal strip means is bent substantially over a 360 degree arc at said serpentine portion such that said metal strip means, on either side of said bent serpentine portion, is configured contacting back to back, and wherein said bent serpentine portion is constructed and arranged as a rounded loop.

5,160,283

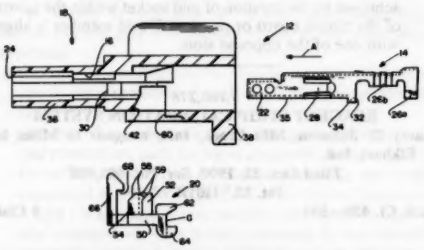
TERMINAL POSITIONING ASSURANCE DEVICE

Rupert J. Fry, Des Plaines, and Gary E. Polgar, Bolingbrook, both of Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Dec. 4, 1991, Ser. No. 802,958

Int. Cl.[5] H01R *13/436*

U.S. Cl. 439—752 **6 Claims**



1. In a terminal retaining electrical connector assembly which includes at least one terminal having a locking surface on the exterior thereof, an insulative housing having a mating end and a terminal insertion end and at least one cavity in which the terminal is received, a window defined by perimeter edges formed in a surface of the housing providing access to the locking surface on the terminal, and a locking member having a locking portion for projecting through the window into engagement with the locking surface on the terminal to retain the terminal in the cavity, the improvement wherein said locking member having a pivoting end and a locking end and is separate and independent of the housing with complementary interengaging pivot means between the housing and the locking member for pivoting the locking member about its pivoting end between an opened position and a closed position in which the locking portion projects through the window into engagement with the locking surface on the terminal, said pivot means comprising two opposed flanges which receive one of said perimeter edges therebetween, and complementary interengaging latch means between the housing and the locking member to hold the locking member in the closed position, said locking member oriented so that the pivoting end of the locking member is directed toward the housing terminal inser-

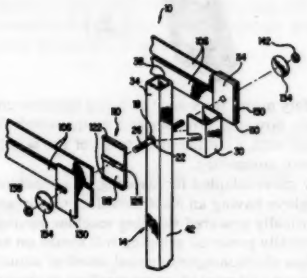
tion end and the locking end of the locking member is directed toward the housing mating end.

5,160,284

ANTI-TURNING DOUBLE-ENDED BOLT ASSEMBLY

Thomas J. Krom, Lebanon, Tenn., assignor to Square D Company, Palatine, Ill.

Filed Jan. 13, 1992, Ser. No. 821,332
Int. Cl.[5] H01R *11/09*
U.S. Cl. 439—797 5 Claims



1. A clamping assembly for providing a substantially uniform pressure simultaneously at two spaced apart locations for making two spaced apart electrical connections simultaneously, said clamping assembly comprising:

a) a portion of a support member, said member having at least two spaced apart parallel sides including an intermediate web perpendicular to said parallel sides for connecting said parallel sides, said portion having a hole therethrough defining a passage through and generally perpendicular to said parallel sides;

b) a tubular sleeve dimensioned to be slidably received in said passage of said support member and having a length not longer than the length of said passage, said sleeve having at least one generally rectangular tab extending longitudinally beyond each end of said sleeve, said tubular sleeve having a noncircular interior cross-sectional shape;

c) an generally U-shaped anti-turn bracket comprising two parallel flanges spaced apart by an intermediate web, said bracket dimensioned for being slidably received over said parallel sides of said support member, said bracket including an elongated slot positioned in each of said flanges for receiving and engaging said tabs of said sleeve to prevent rotation of said sleeve;

d) a bolt having a first threaded end, a second threaded end, and a noncircular portion intermediate said first and second threaded ends, said noncircular portion having a cross-sectional shape dimensioned for being closely received within said noncircular interior cross-sectional shape of said sleeve, said bolt further being slidably received within said sleeve such that linear movement is permitted and rotational movement is prohibited;

e) a first nut threadably received on said first threaded end of said bolt; and

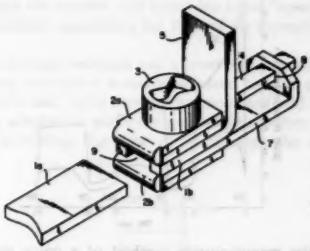
f) a second nut threadably received on said second threaded end of said bolt, whereby tightening either of said first or second nuts exerts a uniform pressure on both sides of said support member due to the linear movement of said bolt in said sleeve.

5,160,285

SEPARABLE CONTACT ARRANGEMENT

Peter Murray, Detmold, Fed. Rep. of Germany, assignor to C. A. Weidmüller GmbH & Co., Fed. Rep. of Germany

Filed Oct. 7, 1991, Ser. No. 772,442
Claims priority, application Fed. Rep. of Germany, Oct. 10, 1990, 4032146
Int. Cl.[5] H01R *4/38*
U.S. Cl. 439—801 9 Claims



1. A separable contact assembly for joining spaced bus bar segments, comprising

(a) first and second contacts (*2a, 2b*) arranged above and below said bus bar segments, respectively, and movable with respect to said segments, said first contact including a guide lug (4) which is guided through a guide opening (6) in an element of the assembly, said second contact including an extension (7) for receiving said guide leg after passage through the opening; and

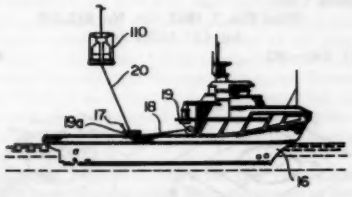
(b) a clamping screw for clamping said contacts to the bus bar segments.

5,160,286

PERSONNEL TRANSFER SYSTEM

George Hill, 1856 Wells Rd., #188, Orange Park, Fla. 32073

Filed Feb. 28, 1991, Ser. No. 661,933
Claims priority, application Canada, Jul. 4, 1990, 2020443
Int. Cl.[5] B63C *9/00*
U.S. Cl. 441—80 30 Claims



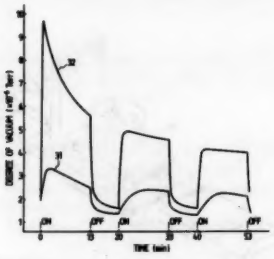
1. A personnel transfer apparatus for providing buoyant support for persons in water and for the transfer of persons from a first vessel to a second vessel floating on water, said apparatus comprising: a rigid, substantially-flat deck and a buoyant, shock-absorbing base supporting said deck, said deck and said shock-absorbing base having sufficient buoyancy to support the whole apparatus and said deck in the water with the deck suspended slightly below the water level; a plurality of peripheral posts and a central post upstanding from said deck, said posts being provided with protective padding along their length, said posts providing a cage for surrounding personnel on the deck, said central post not to be used for lifting purposes; a roof supported by said peripheral posts; supporting cables adapted to be associated with said roof at the area only of said peripheral posts for suspending said personnel transfer apparatus therein; and a tag line connected to said personnel transfer apparatus for connection to said second vessel.

5,160,287

COLOR PICTURE TUBE MANUFACTURING METHOD

Shigemi Hirasawa, Chiba, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 28, 1989, Ser. No. 398,954
Claims priority, application Japan, Sep. 9, 1988, 63-224603
Int. Cl.[5] H01J *9/385, 9/26*
U.S. Cl. 445—40 10 Claims



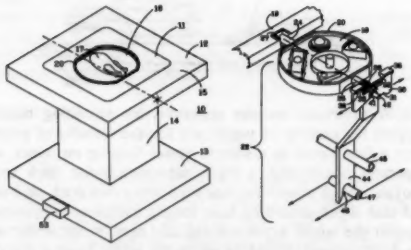
1. In the manufacturing method of a color picture tube comprising i) a frit sealing step to join the panel and funnel having all the necessary parts mounted in the tube, ii) a main sealing step to support the electron gun, and iii) an exhaustion step to evacuate the tube; an improvement in the color picture tube manufacturing method which is featured by further comprising i') a vacuum treatment step provided between the steps I) and ii) to exhaust gases from the space in the tube enclosed by the panel and funnel, before all the parts in the tube are cooled to the room temperature after the end of the step i), whereby said step i') is conducted when said gases are left still in gaseous state and before said gases are condensed to dewdrops or chemically adsorbed into a surface of each part in said tube so that moisture filled in the tube is removed in the state of aqueous vapor and wherein the ultimate vacuum degree, denoted by gas pressure, in the tube at the vacuum treatment step i') is less than 5 Torr.

5,160,288

CONVERTIBLE TOY TABLE

Milan J. Seda, Laguna Niguel, Calif., assignor to Mattel, Inc., El Segundo, Calif.

Filed Feb. 7, 1992, Ser. No. 832,265
Int. Cl.[5] A63H *3/52*
U.S. Cl. 446—482 4 Claims



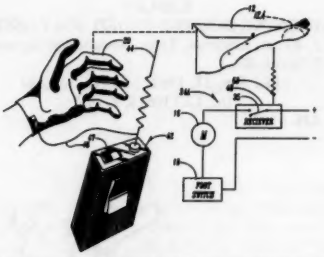
1. A toy table comprising a table top, a central portion of the table top having first and second surfaces, each of the surfaces of the central portion mounting items to appear on the table top, means for mounting the central portion of the table top to rotate in the plane of the tabletop, means for rotating the central portion to place either the first surface or the second surface facing upward, and means for actuating the means for rotating the central portion in response to a push from one side or the other below the table top.

5,160,289

SAFETY MEANS FOR POWERED MACHINERY

Gerald N. DuBois, III, Pleasant Hill, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa

Continuation-in-part of Ser. No. 659,514, Feb. 21, 1991, which is a continuation of Ser. No. 419,124, Oct. 10, 1989, Pat. No. 5,025,175. This application Apr. 6, 1992, Ser. No. 864,233
Int. Cl.[5] A22B *5/16*
U.S. Cl. 452—127 2 Claims



1. A safety means for a meat skinning machine comprising a rotationally powered gripping roll means which functions in conjunction with a cutting knife to sever the skin from a portion of meat, comprising,

a safety glove adapted for wearing by a machine operator, said glove having an electroconducting surface,

an electrically powered skinning machine having a frame,

a rotationally powered gripping roll means on said frame,

a wireless electromagnetic signal receiver actuated control means on said meat skinning machine to control the rotation of said gripping roll by allowing rotation thereof during reception of a wireless electromagnetic signal, and stopping rotation thereof when said wireless electromagnetic signal is interrupted,

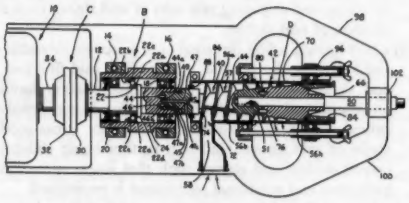
a wireless electromagnetic signal transmitter means connected to said electroconducting surface of said glove so that when said electroconducting surface is grounded to said skinning machine, any wireless electromagnetic signal emitted by said transmitter means will be interrupted and said control means will stop rotation of said gripping roll.

5,160,290

MEAT DEBONING APPARATUS AND METHOD

James B. Richburg, 101 Pumpkin La., Sumter, S.C. 29150

Filed Dec. 11, 1990, Ser. No. 625,412
Int. Cl.[5] B02C *23/16*
U.S. Cl. 452—135 73 Claims



1. Meat deboning apparatus for separating meat from bone material of the type having a drive motor with a motor shaft, an auger for conveying said meat and bone material; a motor coupling for coupling said auger to said motor shaft; a housing surrounding said auger including a feed can having an inlet into which said meat and bone material are fed to an entry end

of said auger, and a sieve screen through which said meat passes to separate meat from said bone material; and an outlet carried by said housing through which said bone material passes after separation from said meat; wherein said apparatus comprises:

an auger having a plurality of sections which include a feed auger and a compression auger integrally coupled together;

said feed auger and compression auger having a continuous tapered root along substantially their entire coupled total length;

said root having a root cross-section area which varies along its length;

flights carried by said auger root having a generally constant outside diameter representing a flight cross-section area which is generally constant over the length of said flights;

said auger having a cross-section area ratio at a given point along its length defined by the ratio of said flight cross-section area to said root cross-section area; and

said cross-section area ratio having a change greater than 2.3:1 over the length of said auger.

5,160,291

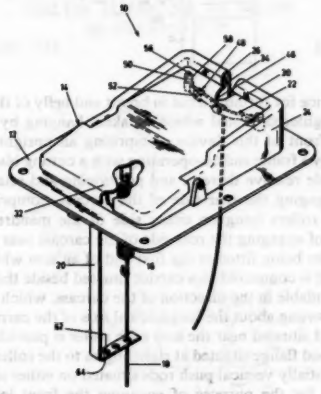
CHIMNEY DAMPER

Walter Sexton, Foster, Ky., assignor to Lyemance International, Inc., Jeffersonville, Ind.

Filed May 29, 1991, Ser. No. 706,896

Int. Cl.[5] F23L *17/02*

U.S. Cl. 454—7 **10 Claims**



1. A chimney damper comprised of

(a) a frame;

(b) a damper flap pivotally mounted on the frame;

(c) a bar and extension pin member comprised of a bar pivotally mounted to the bottom of the damper flap and an extension pin member containing an extension pin which, when extended, will extend through an opening in the damper flap to engage the frame; and

(d) a cable secured to the damper flap and the bar and extension pin member.

5,160,292

VACUUM SYSTEM FOR MULTIPLE WORK AREAS

Kenneth W. Parker, 5595 Calico Rd., West Palm Beach, Fla. 33415

Filed Jan. 30, 1991, Ser. No. 648,548

Int. Cl.[5] B08B *15/00*

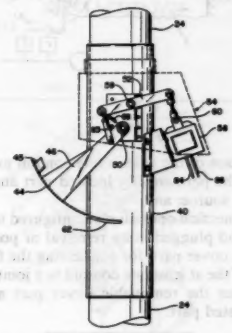
U.S. Cl. 454—49 **4 Claims**

1. A vacuum system for collecting gases and airborne particulates generated by equipment in a plurality of work areas, comprising:

a vacuum source having connected therewith a plurality of vacuum conduits, at least one of said conduits having a vacuum opening;

a gate valve with a gate valve member pivotally mounted by mounting means for pivot about an axis substantially transverse to said vacuum conduit, said gate valve member being insertable through a slot in said vacuum conduit to a "closed" position substantially blocking the flow of air through the conduit, and moveable to an "open" position substantially permitting the flow of air through the conduit;

a valve actuator solenoid and a lever arm operatively connecting said valve actuator solenoid to said gate valve member, said valve actuator solenoid and said lever arm being adapted to move the gate valve member to a position permitting the flow of air through the respective



conduit whenever equipment associated with respective work areas is in a contaminant-generating mode of operation;

said equipment associated with the work area including a switch for placing the equipment in the contaminant-generating mode of operation, said valve actuator solenoid being electrically connected through said switch, movement of the switch to place equipment in the contaminant-generating mode of operation causing the valve actuator solenoid to effect movement of the gate valve member to the "open" position permitting the flow of air through the respective vacuum conduit, and movement of the switch so as to remove the equipment from the contaminate-generating mode of operation causing the return of the valve member to a "closed" position, blocking the flow of air; and,

biasing means adapted to return the gate valve member to the "closed" position when electrical power to the valve actuator solenoid is shut off.

5,160,293

AIR GUIDE BOX

Heinz Koukal, Sindelfingen; Richard Düsterhöft, Böblingen, and Hans Trube, Herrenberg, all of Fed. Rep. of Germany, assignors to Mercedes-Benz AG, Fed. Rep. of Germany

Filed Sep. 11, 1991, Ser. No. 757,635

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1990, 4028899

Int. Cl.[5] B60H *1/24*

U.S. Cl. 454—69 **9 Claims**

1. An air guide box comprising:

a holder;

a permanently located part in the holder;

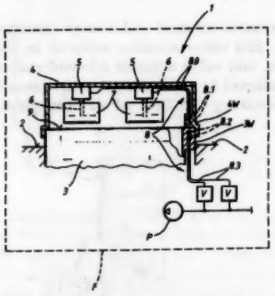
a cover part selectively connectable to and removable from the permanently located part;

at least one air butterfly supported in the removable cover part and adjustable relative thereto for controlling a variable airflow to be guided through the air guide box;

at least one conduit;

at least one controllable actuating element held on the removable cover part for adjusting the at least one air butterfly and operatively connected to a power source by the at least one conduit;

a first section of the at least one conduit extending within a wall of the removable cover part and permanently connected to the actuating element;



a second section of the at least one conduit extending within a wall of the permanently located part and connected to the power source; and

a plug-in connection operatively configured to be selectively released and plugged in by removal or positioning of the removable cover part, for connecting the first and second sections of the at least one conduit in a joint region extending between the removable cover part and the permanently located part.

5,160,294

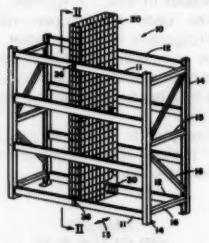
SPACER RACK FOR SMOKE DETECTION

Jay C. Petter, Pentwater, Mich., assignor to Pentwater Wire Products, Inc., Pentwater, Mich.

Filed Mar. 25, 1991, Ser. No. 674,395

Int. Cl.[5] F23J *11/00*

U.S. Cl. 454—357 **12 Claims**



1. Means for directing smoke to a smoke detection member adjacent the ceiling of a warehouse occupied by vertical columns of palletized goods supported on racks, each of said racks having support members connected by vertically spaced horizontal pallet support members at the front and back of the rack on which loaded pallets can be stored to form vertical columns, said means comprising: a vertical airflow shaft mounted in the rack between adjacent columns of palletized articles, said shaft element having a pair of vertical side members adapted to extend between the support members at the front and back of the rack and a pair of vertical end members connecting said side members to form a narrow vertical shaft for air passage extending from adjacent the warehouse floor to adjacent the warehouse ceiling, means for supporting said shaft on said pallet support members, said side and end members being formed of an open grid of interconnecting wires forming spaces therebetween through which air and or smoke can rise freely as a result of thermal convection to deliver it to the smoke detection member adjacent its upper end.

5,160,295

DEVICE FOR FORMING A CUT IN BREAST AND BELLY OF A SLAUGHTERED ANIMAL CARCASS

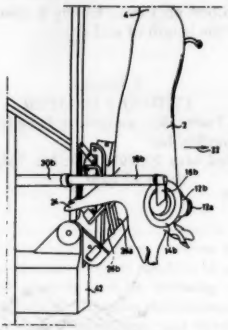
Marinus F. L. Bekkers, Son en Breugel, Netherlands, assignor to C. C. M. Beheer B.V., Ad Nuenen, Netherlands

Filed May 17, 1991, Ser. No. 702,096

Claims priority, application Netherlands, May 17, 1990, 9001154

Int. Cl.[5] A22C *15/00*

U.S. Cl. 452—160 **5 Claims**



1. Device for forming a cut in breast and belly of the carcass of a slaughtered animal which is taken, hanging by the hind legs, in front of this device, comprising an upright mandrel carried by a frame and co-operating with a cutting blade which is movable relative thereto, and positioning and retaining devices engaging the rear side of the carcass, comprising two pressure rollers lying on either side of the mandrel for the purpose of engaging the rear side of the carcass near the head, each roller being fitted at the first end of an arm which at the other end is connected to a carrier situated beside the mandrel and extendable in the direction of the carcass, which arms can each be swung about the longitudinal axis of the carrier, while at the end situated near the arm each roller is provided with a disc-shaped flange situated at right angles to the roller axis and two essentially vertical push rods situated on either side of the mandrel, for the purpose of engaging the front legs of the carcass and for pushing them outwards, each fitted on a carrier which can be extended in the direction of the carcass, and each capable of being swung about the longitudinal axis thereof.

5,160,296

DIRECTORY TAB FOR ORGANIZING AND TRACKING FILES

Solomon Katz, 38 Vista Del Mar, Dana Point, Calif. 92629

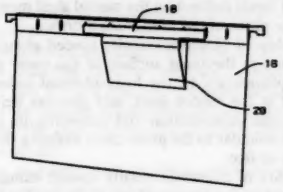
Filed Mar. 25, 1991, Ser. No. 674,122

Int. Cl.[5] B42F *21/00*

U.S. Cl. 462—6 **6 Claims**

1. In a suspended file folder having two vertical spaced vertical walls for storage of documents therebetween, each vertical wall having an exposed upper edge, one of said walls having a series of slots therein at spaced points along its upper edge: the improvement comprising an informational directory device carried on the upper edge of said one wall; said directory device comprising a relatively rigid linear strap (8) having opposite ends, said strap being oriented horizontally on said

one wall with opposite ends thereof extending into selected ones of said slots whereby the strap is attached to the file folder, a pocket-forming panel having an upper edge and a lower edge, said panel having an upper portion thereof engaged flatwise against said strap, the upper portion of said panel being connected to the strap but not to the file folder so



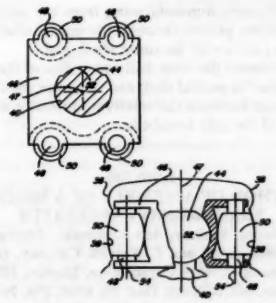
that an upwardly-open mouth is formed between said panel and the plane of said one file folder wall, the lower edge portion of said panel being connected to said one wall to define the lower limit of the pocket, and an information-containment card insertable downwardly into said pocket through said upwardly-open mouth; said card being withdrawable upwardly out of the pocket for viewing or placement of information thereon.

5,160,297

TRIPOD CONSTANT VELOCITY JOINT HAVING MULTIPLE COMPONENT ROLLERS

Frederick J. Uchman, Clarkston, Mich., assignor to GKN Automotive, Inc., Auburn Hills, Mich.

Filed Feb. 12, 1991, Ser. No. 660,559
Int. Cl.[5] F16D *3/26*
U.S. Cl. 464—111 **10 Claims**



1. A constant velocity universal joint comprising:

an outer member having an internal cavity, said internal cavity having a plurality of longitudinal lobes equally spaced about a first axis of rotation, each of said plurality of longitudinal lobes having a pair of opposing side walls, each of said opposing side walls defining a longitudinal guideway;

an inner member disposed within said outer member, said inner member having a second axis of rotation, said inner member having a plurality of trunnions corresponding to said plurality of longitudinal lobes, said plurality of trunnions extending radially in relation to said second axis of rotation, each of said plurality of trunnions being disposed within a respective one of said plurality of longitudinal lobes between said longitudinal guideways; and

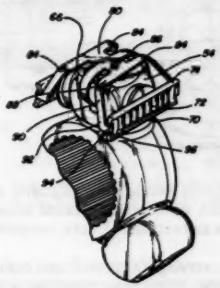
a plurality of multiple component rollers corresponding to said plurality of trunnions, each of said plurality of multiple component rollers being pivotally attached to a respective one of said plurality of trunnions each multiple component roller having at least one pair of rolling members rotatably attached to each of said plurality of multiple component rollers, each of said at least one pair of rolling members rotatably engaging one of said longitudinal guideways and having a rolling axis of rotation perpendicular to an adjacent one of said longitudinal guideways, each of said at least one pair of rolling members being capable of substantial axial displacement along said rolling axis of rotation such that each of said at least one pair of rolling members moves axially along said rolling axis of rotation and linearly traverses the length of said longitudinal guideways when said outer member is angularly displaced relative to said inner member.

5,160,298

TELESCOPIC TRIPLAN UNIVERSAL JOINT BEARING RETAINING SPRING

Dean J. Schneider, Highland, Mich., assignor to GKN Automotive, Inc., Auburn Hills, Mich.

Filed Apr. 29, 1991, Ser. No. 693,433
Int. Cl.[5] F16D *3/26*
U.S. Cl. 464—111 **9 Claims**



5. A telescopic triplan universal joint comprising:

an outer joint member having at least three longitudinal disposed chambers, each chamber having a pair of oppositely disposed longitudinal sidewalls, each sidewall having a longitudinal surface;

an inner joint member disposed within said outer joint member said inner joint member having at least three extending trunnions, each trunnion extending into a respective chamber of said at least three chambers between said oppositely disposed longitudinal sidewalls, each of said trunnions having at least a first partial spherical surface facing each of said longitudinal guide surfaces provided in said respective chamber into which it extends;

a plurality of roller bearings, each roller bearing having a first bearing surface rollingly engaged with a respective one of said longitudinal guide surfaces, and having an opposite bearing surface;

a plurality of buttons, each button having a second partial spherical surface engaged with said first partial spherical surface of each of said radially extending trunnions and having a planar bearing surface engaged with said respective opposite bearing surface of said plurality of roller bearings;

a plurality of bearing cages disposed between each of said buttons and each of said longitudinal guide surfaces, each of said bearing cages having a first end on one side of said button and an opposite end on the other side of said button, said bearing cages maintaining said plurality of roller bearings in position;

a plurality of homogenous positioning springs, each homogenous positioning spring coupled with a first end and an opposite end of at least one pair of said plurality of bearing cages, said positioning springs having resilient means for securing and positioning each of said pairs of bearing

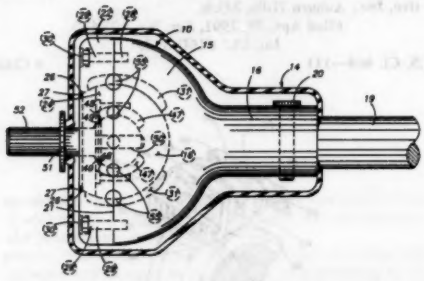
cages in a predetermined position such that during longitudinal movement of said bearing cage with respect to said button said resilient means deflects producing a force which tends to reposition said bearing cage to said predetermined position.

5,160,299

UNIVERSAL JOINT HAVING THREE CONCENTRIC SPHERICAL ELEMENTS INTERCONNECTED FOR RELATIVE MOTION BY A PLURALITY OF BALLS CARRIED IN COOPERATIVE INDENTATIONS DEFINED IN ADJACENT MOVABLE SURFACES

Albert Sweeney, 2720 Dillon Rd., Whitefish, Mont. 59937

Filed Apr. 15, 1991, Ser. No. 684,821
Int. Cl.[5] F16D *3/16, 3/44*
U.S. Cl. 464—141 **2 Claims**



1. A universal joint having three angularly movable, irrotably interconnected, concentric spherical elements that resist both compressive and extensive forces, comprising in combination:

an outer shell carrying a first shaft and defining a spherical medial chamber comprising more than a hemisphere, said outer shell having

a body defining a hemisphere of the spherical chamber with the great circle of the orifice of said hemisphere being perpendicular to the first shaft,

an annular releasably fastenable body extension fitting on the orifice of the body and having an outer surface continuous with the outer surface of the outer shell and defining a partial spherical chamber having a surface continuous with the inner hemispherical chamber defined in the outer shell body, said body extension defining an orifice parallel to the great circle of the outer shell body, and

a plurality of circumferentially spaced bolts extending through holes defined in the outer shell extension and into threaded engagement in cooperating holes defined in the outer shell body to releasably fasten the outer shell extension to the outer shell body;

a medial shell defining an outer spherical surface comprising more than a hemisphere of size to fit within the chamber defined in the outer shell, said medial shell having

a body defining a hemisphere of a spherical chamber with a great circle orifice,

an annular medial body extension releasably carried by the body and defining an internal spherical chamber coextensive with the spherical chamber defining in the body with an orifice parallel to the great circle defining the body orifice, and

a plurality of circumferentially spaced bolts extending through holes defined in the body extension and into threaded engagement with complementary holes defined in the body to releasably fasten the said extension to the medial shell body;

an inner spherical ball carrying a second radially extending shaft and defining a spherical surface fitting within the spherical chamber defined by the medial shell;

means for interconnecting the inner ball and medial shell and between the medial shell and outer body comprising

a plurality of circumferentially spaced hemispherical indentations defined with centers on a circle parallel to the great circle of the inner ball that is perpendicular to the second axis and a plurality of circumferentially spaced hemispherical indentations defined in the outer surface of the medial shell with centers parallel to a great circle defined by the medial shell member parallel to the plane of the medial shell orifice,

a plurality of circumferentially spaced elongate grooves defined in the inner surface of the outer shell spaced complementary tc the hemispherical indentations defined in the medial shell, said grooves being of hemispherical cross-section and extending in great circles perpendicular to the great circle defining the outer shell body orifice;

a plurality of circumferentially spaced elongate grooves defined in the inner surface of the medial shell spaced complementary to the hemispherical indentations defined in the inner ball, said grooves being of hemispherical cross-section and extending in great circles perpendicular to the great circle defining the inner shell body orifice, and

a plurality of balls carried in each hemispherical indentations and extending into the adjacent complementary groove to prevent relative rotation of said interconnected members but allow angular motion of the said members relative to each other; and

a lubricating system comprising:

a first straight duct communicating through the outer shell to a first circular lubrication groove communicating between the spherical indentations defined in the outer surface of the medial shell, and a second straight duct communicating from the first circular lubrication groove to a second circular lubrication groove communicating between the spherical indentations defined in the inner ball,

an output duct communicating from the second circular lubrication groove through the medial and outer shells to the exterior of the outer shell, and

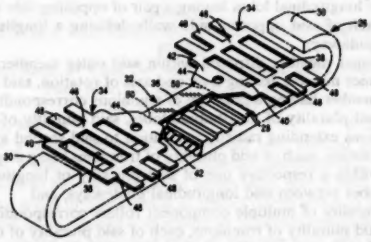
means between the inner ball and orifice of the inner shell, between the medial shell and the outer shell to maintain lubricant between the relatively movable adjacent surfaces of the said members.

5,160,300

METHOD OF ASSEMBLY OF A MOTION TRANSMISSION APPARATUS

Charles A. Moore, Spencer; Ann Kowansky, Ithaca; Robert W. Flood, Trumansburg, and L. Patrick Caveney, Ithaca, all of N.Y., assignors to NCR Corporation, Dayton, Ohio

Division of Ser. No. 630,455, Dec. 19, 1990, Pat. No. 5,106,345.
This application Jan. 10, 1992, Ser. No. 819,243
Int. Cl.[5] F16G *7/00*
U.S. Cl. 474—257 **6 Claims**



1. A method for connecting two end portions of a toothed motion transmission device, said method including the use of a

fastening element having two slotted and apertured interconnected belt engaging elements with extending fingers and a resilient connector having two ends, comprising the following steps:

placing each motion transmission device end portion in engagement with one of the two interconnected motion transmission device engaging elements so that teeth on one side of the motion transmission device end portion fit within the slots of the motion transmission device engaging element;

bending the extending fingers of each motion transmission device engaging element over the motion transmission device end portion and into engagement with the other side of the motion transmission device end portion;

separating the two motion transmission device engaging elements; and

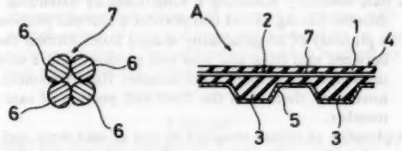
engaging each end of the resilient connector with an aperture in one of the motion transmission device engaging elements.

5,160,301

FIBER-REINFORCED RUBBER

Yasuyuki Nakanishi, and Hiroshi Matsuoka, both of Kobe, Japan, assignors to Bando Chemical Industries, Ltd., Kobe, Japan

Filed May 9, 1991, Ser. No. 697,675
Claims priority, application Japan, May 15, 1990, 2-126336
Int. Cl.[5] F16G *1/10*
U.S. Cl. 474—263 **12 Claims**



1. A fiber-reinforced rubber article, comprising:

a rubber body portion; and

fiber reinforcement embedded in said rubber body portion, said fiber reinforcement comprising cylindrically braided cords braided by yarns, the number of yarns in each said braided cord being an even number from four to eight, each said cylindrically braided cord having a hollow portion extending in the longitudinal direction of and at the center of said cylindrically braided cord, and said hollow portion having a small diameter.

5,160,302

EXERCISING AND PHYSICAL CONDITIONING APPARATUS

Hsung-cheng Li, 17 Lane 18, Chunghsing N. Street, Sanchung City, Taipei Hsein, Taiwan

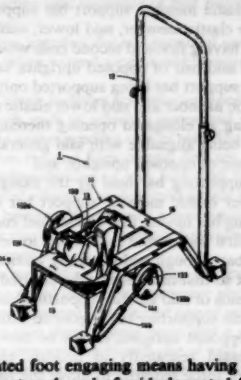
Filed Feb. 11, 1991, Ser. No. 654,353
Int. Cl.[5] A63B *22/04*
U.S. Cl. 482—51 **4 Claims**

1. An exercising machine consisting essentially of:

a main frame having a substantially top horizontal surface area;

a hand rail attached to extend vertically from the frame;

a tread roller which includes a pivotal cylindrical roller body having two ends, wherein two pairs of pedal means are rigidly attached between said ends to said roller body, approximately in the center of said main frame along a horizontal axis, each pair of pedal means having a traverse horizontally positioned pivotal axis and



one elongated foot engaging means having a foot engaging surface at each end of said elongated foot engaging means, said pair of pedal means being mounted on said roller body at a 90° to 135° offset from the other of said pair of pedal means;

a crank coupling means rigidly attached to each end of said roller body; and

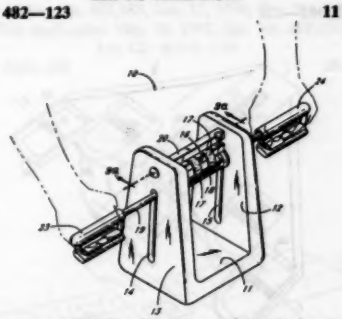
a resistance means comprising two dual action resistance cylinders, having two ends each wherein one end each of said resistance cylinders is pivotally secured to a forward side of the frame and a second end each of said resistance cylinders is pivotally connected to said crank coupling means so as to allow said roller body to be pivotally rotated in a clockwise or a counter clockwise rotation when in use.

5,160,303

ELASTIC RESISTANCE EXERCISE DEVICE HAVING RESISTANCE ELEMENT RETAINING STRUCTURE

Alvin H. Smith, 10720 Lakewood Blvd., #209, Downey, Calif. 90241

Filed Apr. 2, 1991, Ser. No. 679,256
Int. Cl.[5] A63B *21/02*
U.S. Cl. 482—123 **11 Claims**



1. A compact and easily adjusted exercising device useful for exercising the upper arms, shoulders, calves and the like, said device comprising:

a base supportable on a desk, table or the floor;

a pair of opposed uprights supported by and extending upwardly from said base, each of said pair of opposed uprights having a generally vertical slot formed therein, said slots being aligned towards said base;

an upper, elastic member support bar supported, in turn, by said pair of opposed uprights, said upper, elastic member support bar being removable from at least one of said opposed uprights;

at least one elastic member supported by said upper, elastic

member support bar and depending downwardly therefrom;

a lower, elastic member support bar supported by said at least one elastic member, said lower, elastic member support bar having first and second ends which fit lengthwise between said pair of opposed uprights, said lower elastic member support bar being supported only by said at least one elastic member and said lower elastic member support bar having an elongated opening therein, said elongated opening being alignable with said generally vertical slots in said pair of opposed uprights; and

a handle supporting bar held by the elongated opening in said lower elastic member support bar and said handle supporting bar having first and second ends which extend past the first and second ends of said lower elastic member support bar through said generally vertical slots an extent sufficient so that handles may be inserted on the first and second ends of said handle supporting bar whereby when said handle supporting bar is grasped externally from said pair of opposed uprights, it may be moved downwardly and released repeatedly to provide exercise, and the amount of force required to move the handle supporting bar downwardly may be increased by increasing the number or decreasing the amount of elasticity of said at least one elastic member which may be changed by removing one of the handles from the handle supporting bar and then withdrawing the handle supporting bar from said lower elastic member support bar and removing the upper elastic member support bar and replacing, removing or increasing the number of elastic members and reassembling.

5,160,304

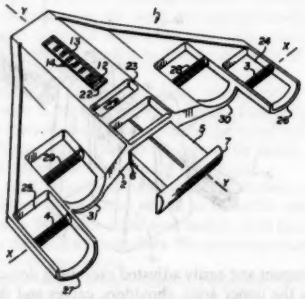
MUSCULATURE EXERCISING APPARATUS

Martin A. Van Der Hoeven, 3330 Carlsbad Blvd. #303, Carlsbad, Calif. 92008

Division of Ser. No. 603,454, Oct. 25, 1990, Pat. No. 5,085,429, which is a continuation-in-part of Ser. No. 395,537, Aug. 18, 1989, Pat. No. 5,005,832, and Ser. No. 360,133, Jun. 1, 1989, Pat. No. 4,966,363, which is a continuation-in-part of Ser. No. 156,404, Feb. 16, 1988, Pat. No. 4,848,740. This application Nov. 12, 1991, Ser. No. 790,881

Int. Cl.[5] A63B *21/05*

U.S. Cl. 482—128 **9 Claims**



1. An apparatus for exercising the musculature of a subject which comprises:

a substantially light-weight, portable rigid body having a front surface;

a rigid arm movably mounted on said body and having a distal portion orthogonally projecting out of said front surface;

resilient means for outwardly biasing said arm against forced movement into said body;

means on said distal portion shaped to provide intimate contact with the subject;

a first pair of handles parallel to said front surface at opposite ends of said body astride said arm; and

a second pair of handles symmetrically set into the front surface astride said arm and between said first pair of handles.

5,160,305

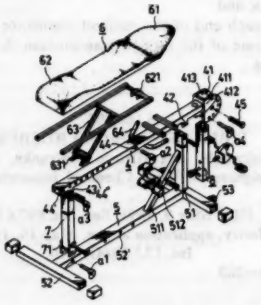
MULTIFUNCTIONAL GYM EXERCISER WITH ADJUSTMENT TABLE

Paul Lin, Tao Yuau, Taiwan 312

Filed Aug. 22, 1991, Ser. No. 748,506

Int. Cl.[5] A63B *21/00*

U.S. Cl. 482—138 **7 Claims**



1. A multi-functional gym exerciser comprising:

a base assembly including a longitudinally extending base member having a front end portion, a rear end portion and a plurality of longitudinally spaced holes formed therein between said front and rear end portions, and a substantially upright support stand member fixedly secured at a lower end thereof to the front end portion of said base member;

a plurality of rollers attached to one of said front and rear end portions of said base member, said plurality of rollers being adapted to engage a ground surface upon tilting of said base assembly in order to aid in moving said multi-function gym exerciser;

a main body assembly including a longitudinally extending main body member having first and second ends, said main body member including at least one semi-circular set plate at the first end thereof, said set plate including a plurality of spaced limiting holes extending therethrough about a substantial portion of its periphery;

means for pivotally mounting said main body member, adjacent the first end thereof, to an upper end of said support stand member;

a movable support member having an upper end pivotally mounted to said main body member adjacent the second end of said main body member and a lower end;

means for selectively securing the lower end of said movable support member to said base member at any one of said plurality of longitudinally spaced holes formed in said base member so as to adjust the position of said main body member relative to said base assembly;

at least one exercise attachment;

means for pivotally attaching said at least one exercise attachment to said set plate at a point radially inwardly spaced from the periphery of said set plate; and

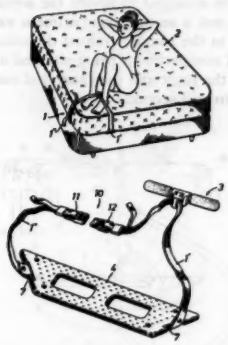
means for selectively securing said at least one exercise attachment against pivotal movement with respect to said set plate, said selective securing means including a setting member adapted to extend through one of said plurality of spaced limiting holes and engage said pivotal attaching means to secure said pivotal attaching means to said set plate.

5,160,306

SIT-UP BELT

Herman Lui, 329, W. 29th St., Apt. 405, New York, N.Y. 10001

Filed Dec. 3, 1991, Ser. No. 802,017
Int. Cl.[5] A63B *26/00*
U.S. Cl. 482—140 **14 Claims**



1. A sit-up exercise device to be used in conjuction with a bed having mattress, said device comprising:

(a) belt means to be disposed around a corner of the mattress;

(b) means for adjusting the length of the belt means; and

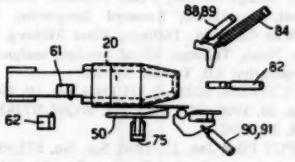
(c) means being connected to said belt means and adapted to be disposed under the corner of the mattress for retaining the belt means around the corner of the mattress during exercise said retaining means is in the form of a planar trapezoid member shaped to generally contour with the corner edges of the mattress and adapted to be placed under a corner of the mattress and held in position by the belt means and the weight of the mattress.

5,160,307

MACHINE FOR MAKING A TAPERING CARTON

Jean-Yves Bacques, Paris, and Guy Coalier, Noce, both of France, assignors to Otor, Paris, France

Filed Dec. 17, 1991, Ser. No. 808,773
Int. Cl.[5] B31B *3/28, 25/28*
U.S. Cl. 493—176 **4 Claims**



1. A machine for making a pack from a blank of sheet material comprising a sequence of rectangular first panels connected to one another via mutually parallel first fold lines and a first set of end flaps disposed on one side of said sequence of panels and connected thereto via second fold lines perpendicular to said first fold lines and intended to form at least a portion of the bottom of said pack, said machine including:

a mandrel whose outside section corresponds to the inside section of said pack to be obtained;

means for freely supporting an intermediate panel of said sequence of panels at least approximately facing the corresponding face of said mandrel, but at a distance therefrom, and then for moving said intermediate panel towards said corresponding face of the mandrel, and then pressing said intermediate panel against said corresponding face after folding the panels adjacent to said intermediate panel so that said adjacent panels bear against said mandrel;

means for winding said sequence of first panels around said mandrel; and

means for fixing together the end panels of said sequence of first panels when wound around said mandrel in this manner;

wherein said blank includes trapezium-shaped or triangular second panels each of which is connected via its base to the side of a corresponding one of said first panels that is furthest from the end flaps of said first set, along a third fold line perpendicular to said first fold lines, with the sloping lateral edges of said second panels being free:

said mandrel being in the form of a rectangular parallelepiped having the base of a truncated pyramid or pyramid placed thereagainst;

said means for supporting, for moving, and for pressing said intermediate panel including a pressure plate having two rigidly interconnected faces, a first one of said faces corresponding to said intermediate panel and a second one of said faces corresponding to that one of said second panels which is adjacent to said intermediate panel, said first and second faces of the pressure plate defining a dihedral angle such that when said first face is pressed against the corresponding face of the rectangular portion of the mandrel, said second face is pressed against one of the faces of the truncated pyramid-shaped or pyramid-shaped portion of said mandrel that corresponds to said adjacent second panel, the edge of said dihedral angle then coinciding with the ridge of said mandrel between said faces of said mandrel that correspond respectively to said rectangular portion and to said truncated pyramid-shaped or pyramid-shaped portion;

means are provided for pressing said second panels against respective corresponding faces of the truncated pyramid-shaped or pyramid-shaped portion of said mandrel; and

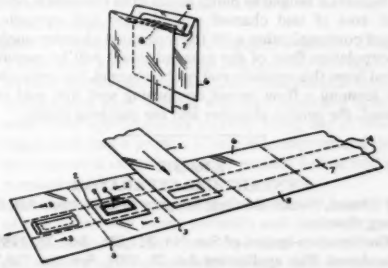
means are provided for fixing together said second panels when pressed in this way against said mandrel.

5,160,308

FLEXIBLE BAG WITH POURING SPOUT

Harry R. Peppiatt, Doylestown, Pa., assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 463,483, Jan. 11, 1990, Pat. No. 5,033,867.
This application May 14, 1991, Ser. No. 699,592
Int. Cl.[5] B31B *1/84*
U.S. Cl. 493—235 **20 Claims**



1. A method of manufacturing a flexible bag with a preformed pouring conduit comprising the steps of:

selecting a longitudinal sheet of flexible material,

forming openings in a central portion of the sheet and locating the openings so that in later folding steps an opening will be in a central portion of an inwardly-folded gusset,

creating flexible conduits connected to said openings, wherein each conduit has an open end in communication with a corresponding opening in the plastic sheet,

folding the sheet to create front and rear panels for a flexible bag and gussets comprising the opening between said front and rear panels, and

separating said folded sheet into individual bags.

5,160,309

CENTRIFUGAL SEPARATOR WITH PUMPING MEANS, ARRANGED TO ACCOMPLISH A CIRCULATING FLOW

Gösta Robertsson, Trangsund, Sweden, assignor to Alfa-Laval Separation AB, Tumba, Sweden

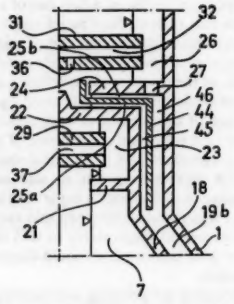
PCT No. PCT/SE89/00138, § 371 Date Nov. 1, 1990, § 102(e) Date Nov. 1, 1990, PCT Pub. No. WO89/10793, PCT Pub. Date Nov. 16, 1989

PCT Filed Apr. 16, 1989, Ser. No. 602,253

Claims priority, application Sweden, May 2, 1988, 8801649

Int. Cl.[5] B04B *1/00*

U.S. Cl. 494—43 **12 Claims**



1. A centrifugal separator for the separation of solids from a liquid suspension, comprising a rotor, the rotor forming a separating chamber having a central part and a peripheral part, means defining within the rotor a central chamber and a channel, the channel having two ends, one said end communicating with the central chamber and the opposite end communicating with the peripheral part of the separating chamber, a first part of the channel being positioned close to the central chamber and extending substantially parallel with the rotor axis, a second part of the channel forming an angle with the rotor axis and extending from the first channel part to the peripheral part of the separating chamber, and pumping means arranged during operation of the rotor to pump liquid out of the central chamber and, thereby, to accomplish a liquid flow through said channel and into the central chamber, wherein the pumping means is arranged to pump liquid from the central chamber to an area of said channel spaced from said opposite end thereof communicating with the separation chamber such that a recirculation flow of the pumped liquid will be established spaced from this opposite end of the channel, the recirculation flow forming a flow circuit comprising said first part of the channel, the central chamber and the pumping means.

5,160,310

CENTRIFUGAL SEPARATOR

Carl Yhland, Nacka, Sweden, assignor to Centritech AB, Norsborg, Sweden

Continuation-in-part of Ser. No. 312,586, Jan. 23, 1989, abandoned. This application Jul. 29, 1991, Ser. No. 736,785

Claims priority, application Sweden, Jul. 6, 1987, 8702781

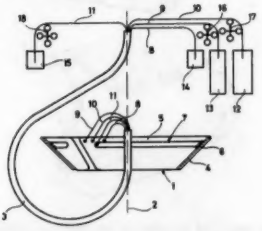
Jun. 10, 1988, PCT/SE88/00312

Int. Cl.[5] B04B *5/00*

U.S. Cl. 494—45 **19 Claims**

1. A centrifugal separator comprising a rotor which is rotatable around a rotor axis, a separation chamber in said rotor, means forming an inlet to the separation chamber for a liquid mixture of components to be separated, means forming a first outlet from the separation chamber at a first distance from the rotor axis for discharge of a separated light component, means forming a second outlet from the separation chamber at a second distance from the rotor axis, greater than said first distance, for discharge of a separated heavy component, means for supplying said mixture to said inlet, and means for discharging out of the rotor via an area near the rotor axis separated components from both said outlets of the separation chamber while the rotor is rotating, comprising:

partition means arranged to divide the separation chamber into a first and a second compartment extending beside each other in the circumferential direction of the rotor, said second compartment being situated at a greater distance from the rotor axis than said first compartment and connected to said second outlet;



equipment actuatable during rotation of the rotor to move the partition means between a first position, in which the compartments communicate with each other along a major portion of their common extension in the circumferential direction of the rotor, and a second position in which the compartments are separated from each other at least along a major portion of their said common extension; and

displacement means actuatable during rotation of the rotor and while the partition means is situated in said second position to positively displace the separated heavy component through said second compartment in the circumferential direction of the rotor towards and out through said second outlet and then radially inwardly to said area near the rotor axis.

5,160,311

CENTRIFUGAL SEPARATOR HAVING A DEVICE FOR THE TRANSFORMATION OF KINETIC ENERGY TO PRESSURE ENERGY

Claes Inge, Saltsjö-Duvnäs; Peter Franzén, Tullinge; Torgny Lagerstedt, Stockholm; Leonard Borgström, Bandhagen; Claes-Göran Carlsson, Tullinge; Hans Moberg, Stockholm, and Olle Nabo, Tullinge, all of Sweden, assignors to Alfa-Laval Separation AB, Tumba, Sweden

PCT No. PCT/SE90/00021, § 371 Date Sep. 10, 1990, § 102(e) Date Sep. 10, 1990, PCT Pub. No. WO90/07983, PCT Pub. Date Jul. 26, 1990

PCT Filed Jan. 11, 1990, Ser. No. 572,952

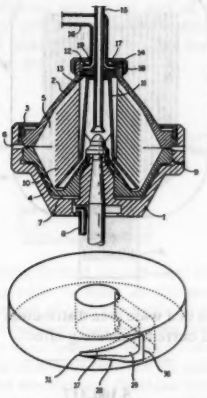
Claims priority, application Sweden, Jan. 13, 1989, 8900113

Int. Cl.[5] B04B *1/08, 11/00*

U.S. Cl. 494—56 **32 Claims**

1. A centrifugal separator having a chamber and a discharge device which transforms kinetic energy of a liquid rotating in the chamber around a rotational axis to pressure energy, the device comprising: an element for the discharge of liquid out of the chamber, the element having a surface surrounding the rotational axis and located in the rotating liquid such that the liquid flows in a predetermined direction along and in contact with the surface completely around the rotational axis, the element forming at least one outlet channel, the outlet channel having an inlet opening in the surface submerged within the liquid, the inlet opening as seen in the flow direction along said surface being delimited by two opposite side edges and a cross edge, the cross edge located downstream of the opposite side

edges and extending across the direction of rotation of the fluid, the outlet channel extending along the flow direction from the inlet opening, the opposite side edges of the inlet opening being formed by two opposite side walls of the outlet



channel and diverging in said flow direction along a part of an extension of the side edges, and at least one of said side edges diverging in such a direction that liquid crossing that side edge flows into the inlet opening.

5,160,312

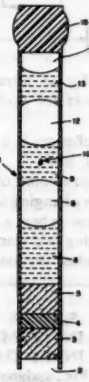
CRYOPRESERVATION PROCESS FOR DIRECT TRANSFER OF EMBRYOS

Steven A. Voelkel, Bryan, Tex., assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation-in-part of Ser. No. 478,216, Feb. 9, 1990, abandoned. This application Feb. 6, 1991, Ser. No. 651,458

Int. Cl.[5] A61B *17/43*

U.S. Cl. 600—34 **21 Claims**



1. A method for embryonic preservation for subsequent culture comprising the steps of

(a) collecting embryos;

(b) placing the embryos in a cryoprotective container with ethylene glycol in a cell culture media of an isotonic salt solution;

(c) allowing the embryos to equilibrate in the cryoprotective solution;

(d) freezing the embryos for a desired time period;

(e) thawing the embryos; and

(f) directly transferring the thawed embryos to a recipient animal.

5,160,313

PROCESS FOR PREPARING TISSUE FOR TRANSPLANTATION

John F. Carpenter, and Kelvin G. M. Brockbank, both of Marietta, Ga., assignors to Cryolife, Inc., Marietta, Ga.

Filed May 14, 1991, Ser. No. 699,873

Int. Cl.[5] A61F *2/04*

U.S. Cl. 600—36 **22 Claims**

1. In a process for treating a transplantable tissue which has been cryopreserved with an intracellular cryoprotectant and thawed prior to transplantation, the improvement comprising eluting the intracellular cryoprotectant to a substantially non-toxic concentration with a solution in only a single step prior to transplantation.

5,160,314

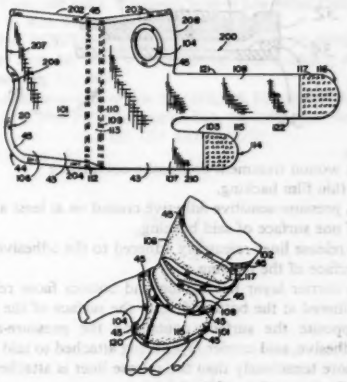
WRIST SUPPORT

Helena Peters, Bromma, Sweden, assignor to Bissell Healthcare Co. and Camp International, Inc., both of Jackson, Mich.

Filed Apr. 26, 1991, Ser. No. 692,166

Int. Cl.[5] A61F *5/10*

U.S. Cl. 602—21 **14 Claims**



1. A pull-on wrist support adapted to be pulled onto the hand and wrist and to anatomically conform to the body in the hand and wrist area comprising:

a sheet of resilient, elastic fabric material shaped to define (1) a main body with top, bottom and opposed side edges, and an inner and an outer surface, and (2) an integral elongated compression strap integral with and extending from said main body approximately midway along one of said side edges such that a portion of said side edge extends above and a portion of said side edge extends below said compression strap;

said side edges being seamed together with said inner surface of said main body facing inwardly and said outer surface facing outwardly, said seam extending at least from approximately said bottom edge of said main body to said elongated compression strap, but said side edges being separated at least from said top edge to approximately the top of said compression strap, to thereby define a sleeve portion with a bottom opening and a top opening through which a user's hand extends;

a thumb opening in said sleeve portion;

closure means located above said compression strap for bringing said separated side edges together above said elongated compression strap to thereby close said main

body upon itself and define an upper opening in said wrist support through which a user's forearm extends;

said compression strap and said outer surface of said main body including cooperating releasable attachment means, and said strap extending from said main body in a direction such that, and having a sufficient length such that, said compression strap encircles the wrist area at least once in use, whereby after a user's hand and wrist have been inserted into said wrist support, said compression strap can be wrapped snugly around the wrist and releasably fastened to said outer surface of said main body.

5,160,315

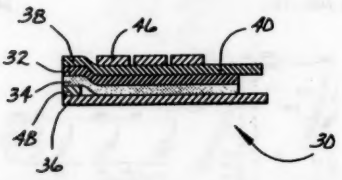
COMBINED ADHESIVE STRIP AND TRANSPARENT DRESSING DELIVERY SYSTEM

Steven B. Heinecke, New Richmond, and Donald G. Peterson, Shoreview, both of Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 5, 1991, Ser. No. 681,120

Int. Cl.[5] A61F *13/00, 15/00*

U.S. Cl. 602—57 **4 Claims**



1. A wound treatment composite comprising

a) a thin film backing,

b) A pressure-sensitive adhesive coated on at least a portion of one surface of said backing,

c) a release liner releasably adhered to the adhesive coated surface of the backing,

d) a carrier layer having top and bottom faces releasably adhered at the bottom face to the surface of the backing opposite the surface containing the pressure-sensitive adhesive, said carrier layer being attached to said backing more tenaciously than the release liner is attached to the adhesive surface of the backing,

e) an adhesive strip releasably adhered to the top face of the carrier layer, wherein said adhesive strip is provided with tab means for enhanced handleability and easy removal of the adhesive strip from the carrier layer.

5,160,316

IONTOPHORETIC DRUG DELIVERY APPARATUS

Julian L. Henley, 38 Munger Rd., Guilford, Conn. 06437

Filed Sep. 10, 1990, Ser. No. 579,799

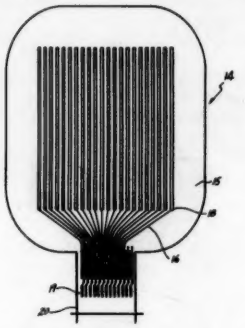
Int. Cl.[5] A61N *1/30*

U.S. Cl. 604—20 **8 Claims**

1. An improved iontophoretic medicament applicator for use with an electrically isolated electrical current loop generator and contactable with a patient's skin that is to be penetrated by the medicament, comprising in combination:

(a) a medicament carrying medium;

(b) an electrically conductive means for conducting electrical current connected to the medicament carrying medium, the electrically conductive means including a plurality of multichannel electrodes, each electrode channel being electrically driven in a current isolated fashion through a corresponding plurality of individual current loops with each channel receiving the same current level to iontophoretically drive the medicament through the



patient's skin in a wide area distribution without incurring an electrical current tunneling effect.

5,160,317

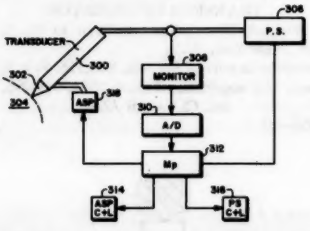
COMPUTER CONTROLLED SMART PHACOEMULSIFICATION METHOD AND APPARATUS

John A. Costin, 6841 Cliffside Dr., Vermilion, Ohio 44089

Filed Jan. 3, 1991, Ser. No. 635,887

Int. Cl.[5] A61B *17/70*

U.S. Cl. 604—22 **21 Claims**



1. A control system for an ultrasonic transducer which includes an aspiration port for operating on a human eye, comprising:

means for monitoring changes in a load encountered by the ultrasonic transducer; and

means for controlling an amount of aspiration based on said load changes, and for changing an amount of aspiration to automatically increase when a load on the transducer increases, and changing said amount of aspiration to automatically decrease when the load decreases.

5,160,318

SURGICAL CUTTING INSTRUMENT WITH CERAMIC COATING ON AN INNER TUBULAR MEMBER

Donald K. Shuler, Largo, Fla., assignor to Linvatec Corporation, Largo, Fla.

Continuation-in-part of Ser. No. 513,291, Apr. 25, 1990, Pat. No. 5,061,238, which is a continuation-in-part of Ser. No. 314,196, Feb. 23, 1989, Pat. No. 4,923,441. This application Apr. 10, 1991, Ser. No. 683,060

The portion of the term of this patent subsequent to Oct. 29, 2008, has been disclaimed.

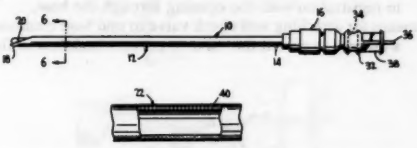
Int. Cl.[5] A61B *17/32*

U.S. Cl. 604—22 **16 Claims**

1. A surgical cutting instrument comprising

an elongate outer tubular member having a distal end and an opening disposed at said distal end;

an elongate inner tubular member having a distal end and a cutting edge disposed at said distal end, said inner tubular member being movably received in said outer tubular member to position said distal end of said inner tubular member adjacent said distal end of said outer tubular member and said cutting edge adjacent said opening to permit said cutting edge to engage bodily tissue through said opening; and



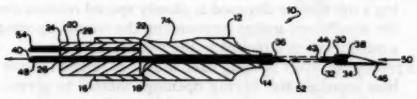
a ceramic coating formed on said inner tubular member and said cutting edge to form an elongate bearing surface along the length of said inner tubular member, said inner tubular member having an outer diameter substantially the same as the inner diameter of said outer tubular member such that the clearance between the outer diameter of said inner tubular member and the inner diameter of said outer tubular member is approximately 0.0075 inches or less.

5,160,319

DUAL-LUMEN OOCYTE ASPIRATION NEEDLE

Jamie Emery, Canyon Country, and Horace Montgomery, Laguna Beach, both of Calif., assignors to Baxter International Inc., Deerfield, Ill.

Filed Oct. 23, 1991, Ser. No. 780,592
Int. Cl.[5] A61M *1/00*
U.S. Cl. 604—27 **7 Claims**



1. A device for retrieving human oocytes from a female ovary, comprising:

(a) a first hub having distal and proximal ends, said first hub having a central channel extending from said distal to said proximal end;

(b) a second hub having distal and proximal ends, said second hub having first and second channels extending from said distal to said proximal ends, said first and second channels being in fluid communication with said central channel in said first hub at said proximal end of said first hub;

(c) an outer cannula having inner and outer walls, said outer cannula being attached to said distal end of said first hub, said outer cannula being in fluid communication with said central channel of said first hub;

(d) an aspiration cannula having distal and proximal ends and having inner and outer walls, said aspiration cannula being attached to said proximal end of said second hub, said aspiration cannula extending through

said first channel of said second hub,

said central channel of said first hub, and

substantially through the length of said outer cannula so that said outer wall of said aspiration cannula is located within and is substantially parallel with said inner wall of said outer cannula

said aspiration cannula also having a portion extending axially outward from said proximal end of said second hub, said inner wall of said aspiration cannula forming an inner aspiration channel to withdraw an oocyte from said distal end of said outer cannula through said first and second hubs;

(e) a side cannula attached to said proximal end of said second hub, said side cannula extending through said second channel of said second hub and being in fluid communication with said central channel of said first hub, said side cannula, said outer wall of said aspiration cannula and said inner wall of said outer cannula forming an outer irrigation channel which extends from said proximal end of said side cannula to said distal end of said outer cannula;

(f) said side cannula having a portion extending axially outward from said proximal end of said second hub so that said portions of said aspiration and side cannulas that extend axially outward from said proximal end of said second hub are parallel to one another;

(g) a collection tube attached to said proximal end of said aspiration cannula to provide a vacuum to said aspiration channel and to receive an oocyte from said aspiration channel; and

(h) an irrigation tube attached to said proximal end of said side cannula to provide irrigation medium to said irrigation channel.

5,160,320

INTRAVENOUS SYSTEM FOR DELIVERING A BENEFICIAL AGENT

Su I. Yum, and Felix Theeuwes, both of Los Altos, Calif., assignors to Alza Corporation, Palo Alto, Calif.

PCT No. PCT/US90/00880, § 371 Date Aug. 12, 1991, § 102(e) Date Aug. 12, 1991, PCT Pub. No. WO90/09201, PCT Pub. Date Aug. 23, 1990
Continuation-in-part of Ser. No. 311,906, Feb. 15, 1989, Pat. No. 4,969,871. This PCT application Feb. 14, 1990, Ser. No. 741,413
Int. Cl.[5] A61M *37/00*
U.S. Cl. 604—85 **52 Claims**

1. An agent formulator for use in a parenteral fluid delivery system, the formulator comprising:

(a) a chamber having fluid inlet and outlet means to maintain a continuous flow of the parenteral fluid therethrough, the chamber having a wall portion comprised of a material that is impermeable to a beneficial agent to be delivered into the fluid, the wall portion having an interior surface and an exterior surface which is accessible from the exterior of the formulator;

(b) a flow distributor within the chamber for distributing the flow of parenteral fluid along the interior surface of the wall portion; and

(c) an agent delivery device attached to the exterior surface of the wall portion, the delivery device comprising a reservoir containing the beneficial agent and a reservoir containing an permeability expanding agent which renders the wall portion permeable to the beneficial agent, the device being releasably attached to the exterior surface of the wall portion;

wherein in operation, the permeability enhancing agent is delivered to the wall portion and renders the wall portion

permeable to the beneficial agent, but impermeable to convective flow of the parenteral fluid therethrough, the fluid flowing through the chamber is distributed by teh flow distributor along the interior surface of the wall portion, causing the agent to be delivered from the device through the wall portion and into the flowing fluid.

5,160,321

BALLOON CATHETERS

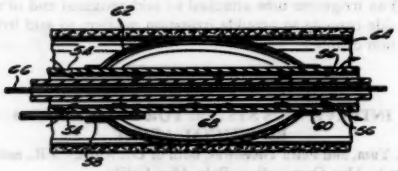
Harvinder Sahota, 3861 Wisteria, Seal Beach, Calif. 90740

Continuation of Ser. No. 593,759, Oct. 5, 1990, which is a division of Ser. No. 276,375, Nov. 23, 1988, Pat. No. 4,983,167. This application Nov. 27, 1991, Ser. No. 799,563

The portion of the term of this patent subsequent to Feb. 25, 2009, has been disclaimed.

Int. Cl.[5] A61M *29/00*

U.S. Cl. 604—96 **12 Claims**



1. A dilation catheter for relieving an obstructed coronary artery while maintaining a steady flow of blood past the obstruction, comprising:

an axially elongate catheter shaft;

a guidewire conduit in said catheter shaft;

a dilatation balloon, secured to said catheter shaft, said dilatation balloon having a proximal end and a distal end;

an inflation lumen in said catheter shaft for transmitting pressurized fluid into and out of said dilatation balloon, for selective inflation and deflation thereof;

a perfusion conduit in said catheter shaft for providing a path through which blood may bypass said dilatation balloon when said balloon is in an inflated state and occluding said artery, said perfusion conduit separate from said guidewire conduit, obviating the need to withdraw said guidewire to allow blood to bypass said dilatation balloon;

a plurality of influent perfusion ports, disposed proximate to the proximal end of said dilatation balloon, said influent ports opening into said perfusion conduit so as to enable blood to enter said perfusion conduit; and

at least one effluent perfusion port opening into said perfusion conduit, said effluent perfusion port disposed proximate said distal end of said dilatation balloon so as to conduct blood from said perfusion conduit back into said artery and maintain a steady flow of blood past said dilatation balloon during the dilatation process.

5,160,322

OCCLUSIVE CHEST SEALING VALVE

William Scheremet, Minneapolis, and Martin W. Van Buren, Coon Rapids, both of Minn., assignors to Brunswick Biomedical Technologies, Inc., Wareham, Mass.

Continuation of Ser. No. 662,779, Feb. 28, 1991, abandoned. This application Mar. 17, 1992, Ser. No. 852,360

Int. Cl.[5] A61M *1/00*

U.S. Cl. 604—122 **4 Claims**

1. A closure valve for attachment to the outer skin surface surrounding an open chest cavity wound of a patient comprising:

a one-way check valve assembly including,

an annular rigid base having an inside and an outside and defining an opening therethrough and adapted to surround the wound of a patient,

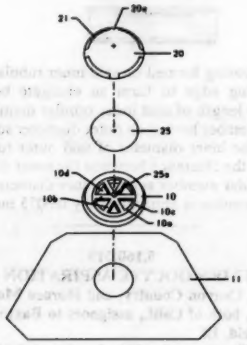
a valve seat formed on the outside of said annular base.

attachment means having pressure-sensitive adhesive on the inside thereof and including an opening therein for surrounding the wound of a patient when attached,

means for securely attaching said annular base to the attachment means with the openings therein in substantial axial alignment to permit the base member to be securely attached to the body of a patient with the wound opening substantially centered within the aligned openings of the base and the attachment means,

a generally flat check valve mounted on the top of said base in registration with the opening through the base,

means for attaching said check valve to said base member in a manner to permit the valve to prevent backflow of fluid



through the opening but permitting the discharge of fluid outwardly through the opening to maintain a negative pressure within the chest cavity communicating with the body wound,

the valve and base assembly being relatively thin and defining a top surface disposed in closely spaced relation above the attachment means surrounding the wound opening of a patient when attached to the patient,

a protective cover housing fixed in spaced relation above the base member and having openings therein to permit air and body fluids passing through the valve to escape from the wound, the lower edges of the openings lying in a plane defined generally by the base member and valve seat provided thereby to prevent any build-up of fluids under the housing outside of the valve.

5,160,323

METHOD AND SYSTEM FOR INSERTING SPINAL CATHETERS

Daniel E. Andrew, 524 Beechwood Drive, Unit 1, Waterloo Ontario, Canada N2T 2G9

PCT No. PCT/CA90/00169, § 371 Date Mar. 25, 1991, § 102(e) Date Mar. 25, 1991, PCT Pub. No. WO90/14124, PCT Pub. Date Nov. 29, 1990

PCT Filed May 24, 1990, Ser. No. 656,153

Int. Cl.[5] A61M *25/01*

U.S. Cl. 604—158 **18 Claims**

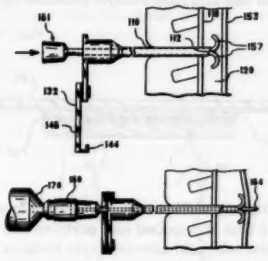
1. A catheter system for the insertion of a flexible catheter through the epidural space and dura-arachnoid membrane into the subarachnoid space of the spine of a patient comprising:

(a) a hollow needle having a sharpened tip, for insertion into the epidural space, and an exit end having a hub;

(b) a cannula with a blunt distal end adapted for placement into and for coaxial movement within the hollow needle, whereby said cannula can be advanced forwardly within the hollow needle for abutment of the blunt distal end against the dura-arachnoid membrane to place the dura-arachnoid membrane in tension;

(c) securing means for engaging and restraining the cannula within the hollow needle from coaxial rearward movement therein; and

(d) a flexible catheter having a wire therein for insertion through the cannula and for penetrating the dura-arach-



noid membrane, whereby the distal end of the catheter can be inserted a predetermined distance through the dura-arachnoid membrane into the subarachnoid space, the cannula and the hollow needle retracted along the catheter, and the wire withdrawn from the catheter.

5,160,324

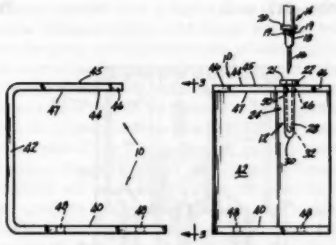
HYPODERMIC SYRINGE SHEATH HOLDER, COMBINATION USING SAME AND HANDLING METHOD

Charles M. Halbach, 146 Main St., Hampton, Conn. 06247

Continuation of Ser. No. 369,953, Jun. 22, 1989, abandoned. This application Aug. 1, 1991, Ser. No. 742,157

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—192 **3 Claims**



1. A syringe sheath holder consisting of

(a) a planar upwardly facing operative portion; said operative portion having a side perpendicular to said upper operative portion, said side having a base perpendicular to said side, said upper operative portion, side and base being of unitary construction;

(b) said upper operative portion having an upwardly and downwardly facing surface and a first hole having an upper end in open communication with said upwardly facing surface, and a downward end in open communication with said downwardly facing surface, said first hole has a lateral size to receive a hypodermic syringe sheath of a first predetermined size in a releasable sliding fit engagement, said upper operative portion has additional holes in communication with said upwardly facing surfaces, said additional holes are of different lateral sizes adapted to receive hypodermic syringe sheaths of different predetermined sizes in a releasable sliding fit engagement;

(c) said first and additional holes of different lateral sizes are cylindrical and said hole axes are perpendicular to said upwardly and downwardly facing surfaces;

(d) said base is provided with mounting holes to mount said syringe sheath holder on a support surface permitting the ready insertion, support and removal of a syringe and its sheath in said releasably sliding fit engagement and alternatively when in axial alignment of said hole said syringe and sheath are cocked the removal of the syringe is possible retaining the sheath in said syringe sheath holder.

5,160,325

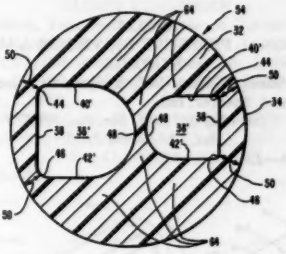
CATHETER WITH NOVEL LUMENS SHAPES

Colin J. Nichols, Fruit Heights; Gregory N. Nordgren, West Valley City, and Harvey R. Moorehead, Salt Lake City, all of Utah, assignors to C. R. Bard, Inc., Murray Hill, N.J.

Division of Ser. No. 160,473, Feb. 25, 1988, Pat. No. 4,995,863, which is a continuation of Ser. No. 915,474, Oct. 6, 1986, Pat. No. 4,753,640. This application Jan. 22, 1991, Ser. No. 644,970

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—247 **33 Claims**



1. An indwelling catheter tube comprising:

(a) an elongated body of elastomeric material having an outside surface;

(b) a lumen longitudinally formed through said body of elastomeric material and comprising a plurality of longitudinally extending inner wall surfaces, one of said inner wall surfaces in a cross section of said body of elastomeric material taken normal to the longitudinal axis thereof comprising a straight segment, the end points of said straight segment being disposed closer to said outside surface of said body of elastomeric material than the portions of said straight segment therebetween, thereby to define, between said straight segment and said outside surface of said body of elastomeric material radially outwardly from said straight segment, a solid outer wall portion of said catheter tube integrally formed of said elastomeric material.

5,160,326

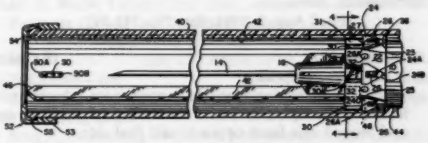
COMBINED SYRINGE AND NEEDLE SHIELD

Daniel A. Talonn, University City, and Alan B. Ranford, St. Louis, both of Mo., assignors to Sherwood Medical Company, St. Louis, Mo.

Division of Ser. No. 212,528, Jun. 28, 1988, Pat. No. 5,053,018. This application Jun. 19, 1991, Ser. No. 717,592

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—198 **24 Claims**



1. A needle shielding device for use with a barrel, wherein a

needle may be attached to the distal end of the barrel, the improvement comprising:

shield retaining means mounted on said barrel in use and including at least one locking slot and a keyway on an outer surface thereon and said keyway being longitudinally oriented therealong and includes distal and proximal ends thereon, and

an elongated needle shield having an inner surface and being movable over said barrel and retaining means between a retracted position in which the needle is exposed and an extended position in which the needle is exposed and an extended position in which said shield covers said needle, said shield including at least one elongated key extending inwardly on its interior surface, said key adapted to slide through said keyway between said retracted and extended positions and wherein said key is an elongate and longitudinally oriented member extending inwardly from said inner surface of said shield and includes distal and proximal ends thereon.

5,160,327

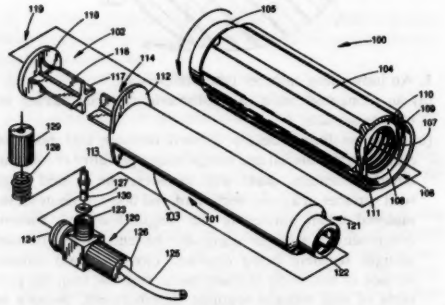
ROTATIONAL PRESSURE DRIVE FOR A MEDICAL SYRINGE

Joseph R. Stines, Poland, Ind., assignor to Vance Products Incorporated, Spencer, Ind.

Filed May 31, 1991, Ser. No. 708,673

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—224 **20 Claims**



1. A rotational pressure drive for a syringe having a barrel, a plunger positioned through a proximal end of said barrel, and first and second flanges extending radially and laterally from said proximal end, comprising:

an elongated member having a closed end forming means for engaging said plunger, an open end for reception of said plunger, and a passageway extending longitudinally between said open and closed ends for passage of said plunger therethrough; and

first and second pluralities of internal threads extending radially into and longitudinally along said passageway forming means for engaging said first and second flanges, respectively.

5,160,328

HYDROGEL BANDAGE

James V. Cartmell, Xenia, and Wayne R. Sturtevant, Centerville, both of Ohio, assignors to NDM Acquisition Corp., Minneapolis, Minn.

Filed Aug. 7, 1991, Ser. No. 741,317

Int. Cl.[5] A61F *13/02*; A61L *15/00*; C08L *15/00*

U.S. Cl. 604—307 **19 Claims**

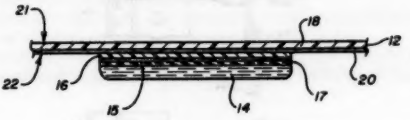
1. A bandage comprising:

a backing layer having first and second sides wherein said first side is adapted to face a sin surface of a patient and said second side faces opposite said first side;

a pressure sensitive adhesive layer coated onto said first side of said backing layer, said adhesive layer having first and second end portions which are capable of adhering to the skin surface of said patient;

a support layer having first and second sides wherein said first side of said support layer is adhered to said adhesive layer; and

a hydrogel layer formed on said second side of said support layer such that said support layer provides rigidity for said



hydrogel layer, said hydrogel layer being located intermediate said first and second end portions and substantially coextensive with said adhesive layer to the extent that said first and second end portions of said adhesive layer are exposed for adhering to the skin surface of said patient, said hydrogel layer comprising a polyurethane hydrogel material suitable for absorbing bodily fluids.

5,160,329

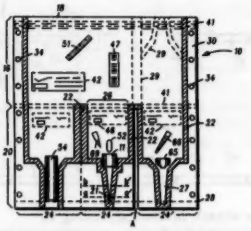
BIOLOGICAL FLUID SPECIMEN COLLECTION BAG

L. Thomas Oxley, Riverwoods, Ill., assignor to T Systems Inc., Riverwoods, Ill.

Continuation-in-part of Ser. No. 509,257, Apr. 13, 1990. This application Jul. 10, 1990, Ser. No. 550,641

Int. Cl.[5] A61M *1/00*

U.S. Cl. 604—317 **21 Claims**



3. A collection system for a human urine specimen collected solely for analysis comprising;

a plastic bag for accumulating said human urine specimen, said plastic bag having at least one collection port allowing the input of said human urine specimen and further including means for sealing said collection port after collection of said human urine specimen and after collecting said human urine specimen said plastic bag is sealable into at least two subcompartments by sealing means resulting in sealed subcompartments containing redundant, substantially homogeneous forms of said human urine specimen collected solely for said analysis purposes; and

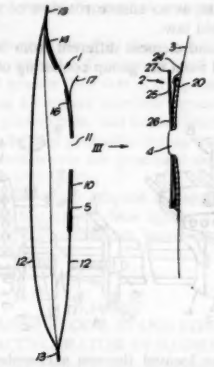
said plastic bag further including at least one access port allowing the controlled dispensing from at least one of said subcompartments of said bag of said human urine specimen for said analysis, said plastic bag further including a displaceable element means for displacing in order to selectively dispense and draw into said system said human fluid specimen.

5,160,330

MEDICO-SURGICAL COLLECTION BAG ASSEMBLIES

David E. Cross, Rustington, England, assignor to Smiths Industries Public Limited Company, London, England

Filed Sep. 9, 1991, Ser. No. 756,550
Claims priority, application United Kingdom, Sep. 15, 1990, 9020218
Int. Cl.[5] A61F 5/44
U.S. Cl. 604—339 13 Claims



1. In a medico-surgical collection bag assembly for body waste products of the kind comprising a fitment including a flexible plate with an adhesive rear surface that adheres to the user's skin around a body waste opening, and a collection bag that is attachable to and releasable from the fitment, the improvement wherein the fitment includes an annular, planar floating flange member attached to said plate at a rear surface of said flange member over a region close to an inner edge of said annular flange member, said flange member being unattached to the plate radially outwardly of said region close to the inner edge of the flange member, the flange member having a nonadhesive planar front surface, the collection bag having an adhesive region around an opening to the bag that adheres directly to the planar front surface of the flange member over at least that part of the flange member radially outwardly of the said region close to the inner edge, and said flange member being bendable and more resilient than the plate such that the plate can conform to the surface of the user's skin without substantially deforming the flange member from a relatively flat shape but the flange member can be bent by the weight of the bag and its contents before the adhesive on the bag peels away from the flange member.

5,160,331

ABSORBENT INSERT

Ralph H. Forester, Minneapolis, and Arthur B. Finkelstein, Wayzata, both of Minn., assignors to Progeny Products, Inc., St. Paul, Minn.

Continuation-in-part of Ser. No. 730,261, Jul. 12, 1991. This application Dec. 2, 1991, Ser. No. 801,695
Int. Cl.[5] A61F 13/15
U.S. Cl. 604—364 23 Claims

1. A biodegradable liquid-absorbent insert comprising:

first and second outer webs of non-toxic, biodegradable, pliable, liquid-absorbent material;

a liquid-absorbent layer comprising non-toxic, biodegradable, liquid-absorbent granules sandwiched between the first and second webs, at least some of the granules comprising irregularly-shaped grains, the first and second webs assuming the irregular shape of a substantial number of individual ones of the grains to mechanically bond the

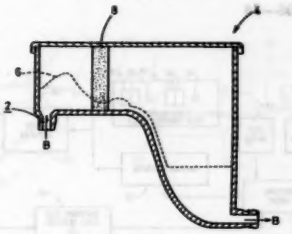
first and second webs together with the granules sandwiched between said assumed irregular shape.

5,160,332

BLOOD RESERVOIR

Osamu Nomura, Fuji, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP88/00680, § 371 Date Jan. 2, 1990, § 102(e) Date Jan. 2, 1990, PCT Pub. No. WO89/00055, PCT Pub. Date Dec. 1, 1989
PCT Filed Jul. 6, 1988, Ser. No. 457,785
Claims priority, application Japan, Jul. 7, 1987, 62-167769
Int. Cl.[5] A61M 1/00
U.S. Cl. 604—405 11 Claims



1. A blood reservoir comprising:

a blood inlet port;

a blood storage chamber communicating with the blood inlet port;

a blood outlet port defined in a lower portion of the blood storage chamber; and

a fluid-permeable blood spouting inhibitor comprising a mesh structure having respective side edges disposed over said blood inlet port in substantially covering relation thereto, with only one of said side edges of the mesh structure being fixed, said mesh structure being flexible upwardly with respect to said blood inlet port for allowing air bubbles in the blood to bypass said mesh structure without breaking apart while allowing blood from said blood inlet port to flow through said mesh structure.

5,160,333

METHOD FOR MIXING BLOOD WITH ANTICOAGULANT

John R. Wells, Culver City, Calif., assignor to Solco Hospital Products Group, Inc., Hingham, Mass.

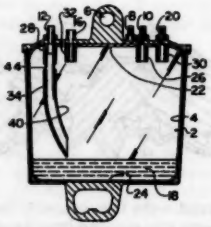
Filed Feb. 1, 1991, Ser. No. 649,831
Int. Cl.[5] A61M 1/00
U.S. Cl. 604—408 4 Claims

1. A method for mixing blood with anticoagulant comprising the following steps:

Step A: evacuating air from a rigid container and expanding a blood bag contained therein;

Step B: preloading anticoagulant into the blood bag;

Step C: evacuating air from the blood bag within the rigid container; and then



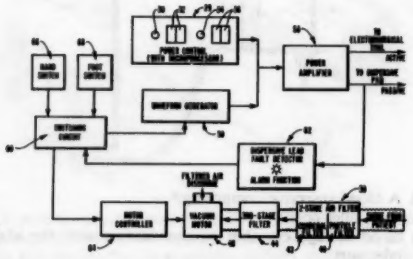
Step D: drawing blood into the blood bag and directing the blood toward the bottom of the blood bag with force by means of a mixing tube so as to mix the blood with the anticoagulant.

5,160,334

ELECTROSURGICAL GENERATOR AND SUCTION APPARATUS

R. Gail Billings, Holladay; William D. Wallace, Salt Lake City; Christopher A. Cutler, Centerville, and B. Tod Cook, Sandy, all of Utah, assignors to Utah Medical Products, Inc., Midvale, Utah

Filed Apr. 30, 1991, Ser. No. 693,560
Int. Cl.[5] A61B *17/39*
U.S. Cl. 606—34 **30 Claims**



1. An apparatus for operating an electrosurgical tool during electrosurgery, comprising:

a generator means for providing power to the electrosurgical tool;

a smoke removal means for removing and filtering smoke from the site of the electrosurgery; and,

a switching means for activating said smoke removal means substantially simultaneous to the activation of the electrosurgical tool by said generator means, such that said smoke removal means is activated automatically whenever the electrosurgical tool is activated.

5,160,335

PIN HOLDER SUPPORT

Marcel H. Wagenknecht, Le Lignon, Switzerland, assignor to Jaquet Orthopédie S.A., Geneva, Switzerland

Filed Dec. 8, 1989, Ser. No. 447,972
Claims priority, application Switzerland, Dec. 15, 1988, 04631/88
Int. Cl.[5] A61B *17/56, 17/58, 17/60*
U.S. Cl. 606—59 **17 Claims**

1. A device for fastening and angularly positioning a set of bone pins with respect to a fixation bar, said device comprising:

(a) a clamp for gripping said bone pins,

(b) a deflection member, and

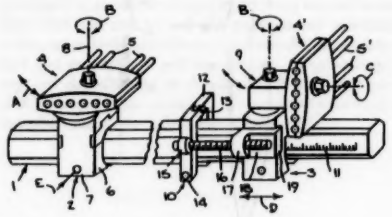
(c) a jaw for positioning said clamp in a selected position along said fixation bar,

wherein said deflection member is located between said clamp and said jaw,

wherein said deflection member has a first face comprising a first rotation means and a second face opposite to said first face comprising a first curved guide means,

wherein a first element selected from the group consisting of said clamp and said jaw has located thereon a complementary rotation means which cooperates with said first rotation means so as to ensure rotation of said clamp with respect to said jaw,

wherein a second element different from said first element and selected from the group consisting of said clamp and



said jaw has located thereon a complementary curved guide means which cooperates with said first curved guide means so as to ensure swivelling of said clamp with respect to said jaw,

wherein said clamp comprises an upper clamp grip and a lower clamp grip which have central passages for a clamping arrangement, and

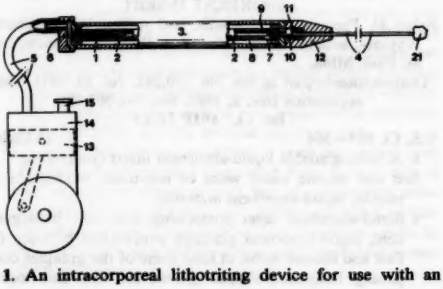
wherein a third element selected from the group consisting of said upper clamp grip and said lower clamp grip is provided with projections intended to penetrate into corresponding recesses in a fourth element different from said third element and selected from the group consisting of said upper clamp grip and said lower clamp grip, so as to prevent rotation of said upper clamp grip with respect to said lower clamp grip.

5,160,336

DEVICE FOR ACTING BY ULTRASONIC VIBRATIONS ON AN OBJECT

Robert Favre, Lausanne, Switzerland, assignor to Ferton Holding, Delemont, Switzerland

Continuation of Ser. No. 273,894, Nov. 21, 1988, abandoned. This application Oct. 19, 1990, Ser. No. 599,259
Claims priority, application Switzerland, Nov. 19, 1987, 4473/87
Int. Cl.[5] A61B *17/22*
U.S. Cl. 606—128 **7 Claims**



1. An intracorporeal lithotriting device for use with an

endoscope of a size compatible with its introduction into a urinary passage, comprising:

a) a high frequency shock wave generator having a projectile of an elongate shape and defining an axial length dimension and arranged within a guiding tube of a substantially greater axial length dimension than that of said projectile, said projectile being completely enclosed within said guiding tube and said guiding tube axially guiding said projectile during alternating forward and return axial movements along the entire length of said guiding tube, said axial movements being imparted to said projectile by means disposed at an upstream end of said guiding tube;

b) a waveguide of an elongate shape in axial alignment with said guiding tube at a downstream end thereof and of an axial length greater than that of the projectile, said waveguide having an impact interface opposite said upstream end of said guiding tube, said impact interface being struck periodically by said projectile during its axial movements whereby shock waves are generated that are transmitted through said waveguide;

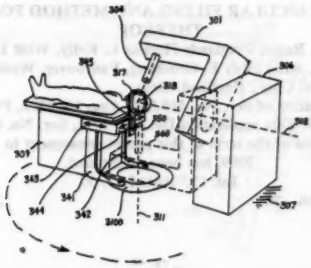
c) said waveguide being adapted for applying its free end opposite said impact interface against a calculus and for thusly transmitting said shock waves directly to said calculus for breaking it.

5,160,337

CURVED-SHAPED FLOOR STAND FOR USE WITH A LINEAR ACCELERATOR IN RADIOSURGERY

Eric R. Cosman, 872 Concord Ave., Belmont, Mass. 02178

Filed Sep. 24, 1990, Ser. No. 587,016
Int. Cl.[5] A61B *19/00, 6/00, 6/04*
U.S. Cl. 606—130 **6 Claims**



1. A floor stand for a linear accelerator that has a base that is mounted on a floor and a rotatable gantry, said floor stand adapted to be collision-free relative to the gantry of said linear accelerator which rotates about a horizontal axis defined by said linear accelerator, said linear accelerator having a vertical axis around which a patient couch rotates, said patient couch being designed to support a patient during external irradiation by said linear accelerator through said linear accelerator gantry, said patient and said patient couch rotating about a couch bearing whose axis is said vertical axis and said couch bearing being fixed relative to the base of said linear accelerator, said vertical axis and said horizontal axis being arranged to intersect at the isocenter of said linear accelerator said patient having patient index which is fixed relative to said patient's body and provides a stereotactic reference base relative to said patient's anatomy, and said patient index position can be determined relative to said linear accelerator and said linear accelerator isocenter, so that an anatomical target in said patient's body can be determined by imaging to be in a known position relative to said patient index and thus can be positioned at said linear accelerator isocenter, said floor stand comprising:

a floor stand element attached to a floor stand bearing which is attached to said floor and whose axis is the same as said vertical axis, so that said floor stand element rotates also about said vertical axis and in the same angular orientation as said patient couch rotates about said vertical axis, said floor stand element, therefore, being a stable, independent reference object relative to said linear accelerator isocenter and said vertical axis when said floor stand element and said patient couch are in the same angular rotation position about said vertical axis, so that said patient index and said anatomical target can be positioned stably relative to said floor stand element and thus to said linear accelerator isocenter independent of variations of said patient couch position with patient loading or rotational orientation due to possible perturbations of the couch around its couch bearing,

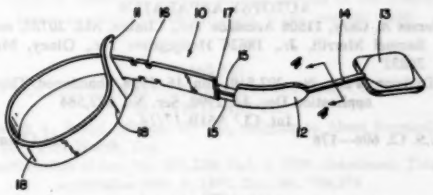
said floor stand element having a collision-free portion which is spatially separated from said vertical axis over a portion of said vertical axis, so that said gantry in its rotational variation about said horizontal axis of said linear accelerator will not collide with said floor stand element when said gantry position intercepts said vertical axis for at least some rotational positions of said floor stand element about said vertical axis.

5,160,338

DEVICE FOR REMOVING IMPLANTABLE ARTICLES

Vernon L. Vincent, Santa Barbara, Calif., assignor to INAMED Development Co., Carpinteria, Calif.

Filed Nov. 13, 1991, Ser. No. 792,030
Int. Cl.[5] A61B *17/08, 17/00;* **A61F** *2/02*
U.S. Cl. 606—157 **2 Claims**



1. A reversible implantable device, a portion of said device comprising a reversible portion having an exterior surface and an interior which may be anchored within the body by means of one or more ligatures passed therethrough, said reversible portion comprising a wire guiding lumen housed within the interior portion, a suture-retaining wire passing through the wire guiding lumen, and at least one slot connecting said wire guiding lumen to the exterior surface of said reversible portion.

5,160,339

ENDOSCOPIC SUTURE CLIP

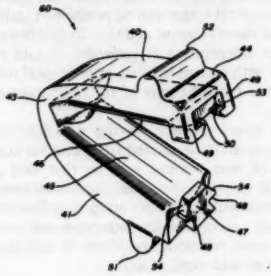
Chao C. Chen, Edison; William Zwaskis, Fanwood, both of N.J., and Mark Ortiz, Milford, Ohio, assignors to Ethicon, Inc., Somerville, Ohio

Filed Jun. 18, 1991, Ser. No. 717,134
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—158 **3 Claims**

1. A surgical clip comprising first and second leg members joined at their proximal ends by resilient hinge means and terminating at their distal ends in latch means, each leg member having an outer surface and a clamping inner surface, said clamping inner surface being in opposition to the clamping inner surface of the other leg member, the outer surface of each leg member being configured to be accepted by the jaws of a clip applier;

the improvement wherein the clamping inner surface of said first leg member has a convex radius of curvature extending transversely across substantially the entire width of said first leg member, the clamping inner surface of said second leg member has a concave radius of curvature

extending transversely across substantially the entire width of said second leg member, the radius of curvature of the clamping inner surface of said first leg member being smaller than the radius of curvature of the clamping inner surface of said second leg member, the radius of



curvature of the clamping inner surfaces of said first and second leg members being complementary, and when the clip is in a clamped position, the clamping inner surfaces of said first and second leg members are in substantially complete contacting relationship so as to minimize the gap which is created between said surfaces.

5,160,340

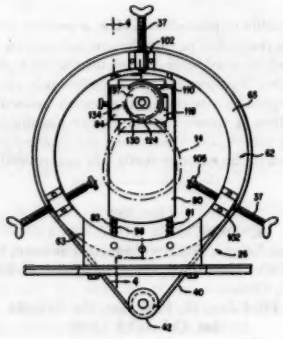
AUTOPSY APPARATUS

James A. Gary, 11506 Accolade Ter., Clinton, Md. 20735, and Samuel Merrill, Jr., 18624 Hedgegrove Ter., Olney, Md. 20832

Division of Ser. No. 207,519, Jun. 16, 1988, abandoned. This application Dec. 14, 1990, Ser. No. 627,584

Int. Cl.[5] A61B *17/14*

U.S. Cl. 606—176 **14 Claims**



1. An apparatus comprising:

a circular stationary support;

a carrier assembly which is mounted on the stationary support;

a slide assembly which is mounted on said carrier assembly on the surface opposite said stationary support and which is positioned across an opening defined by said stationary support;

a cutter support block supporting a spindle, said spindle having mounted thereon a circular notary cutter, wherein said cutter support block is movably mounted on said slide assembly with said spindle carrying said rotary cutter extending through a slot in said slide assembly.

5,160,341

RESORBABLE URETHRAL STENT AND APPARATUS FOR ITS INSERTION

Rodney A. Brenneman, Mission Viejo, and Jay A. Lenker, Laguna Beach, both of Calif., assignors to Advanced Surgical Intervention, Inc., San Clemente, Calif.

Filed Nov. 8, 1990, Ser. No. 610,543

Int. Cl.[5] A61M *29/00*

U.S. Cl. 606—198 **41 Claims**

1. A device for inserting a helically-coiled stent, formed of a resiliently-deformable, biocompatible material, into a bodily lumen of a patient, comprising:

an elongate, hollow, tubular sheath adapted for insertion into the lumen, the sheath having an open distal end;

first means, engageable with the stent, for (a) carrying the stent within the sheath, and (b) discharging the stent into the lumen through the distal end of the sheath; and

second means, operatively connected to the sheath and engageable with the stent while the stent is engaged with the first means, for resiliently compressing the stent from an uncompressed first diameter to a compressed second diameter when the stent is inserted into the sheath;

whereby the stent is resiliently restored to substantially its first diameter when discharged through the distal end of the sheath into the lumen.

5,160,342

ENDOVASCULAR FILTER AND METHOD FOR USE THEREOF

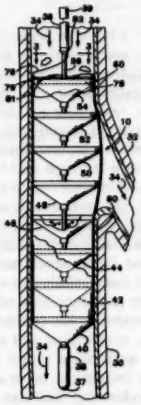
Vincent A. Reger, Portland; Thomas L. Kelly, West Linn, both of Oreg., and LeRoy E. Groshong, Vancouver, Wash., assignors to Evi Corp., Portland, Oreg.

Continuation of Ser. No. 568,844, Aug. 16, 1990, Pat. No. 5,108,419. This application Dec. 30, 1991, Ser. No. 814,141

The portion of the term of this patent subsequent to Apr. 28, 2009, has been disclaimed.

Int. Cl.[5] A61M *25/00*

U.S. Cl. 606—200 **22 Claims**



16. An expandable and collapsible filter assembly in combination with an elongate support member of a catheter for use in a blood vessel of a patient, said combination comprising:

an elongate support member disposed at the longitudinal axis of the filter assembly over the entire length of the filter assembly in all operational states;

at least one filter element comprising means for attaching said at least one filter element to said elongate support member at a first filter assembly end and means extending from said attaching means for supporting a flexible tubular porous stocking which forms an exterior surrounding wall of said filter assembly, said supporting means comprising radially outwardly extending ribs of sufficient flexibility to permit the stocking to be twisted and furled and a mouth of the stocking to be spirally closed thereby and which provide support for at least one transversely disposed filter;

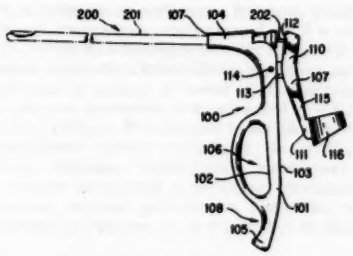
the tubular porous stocking attached and circumferentially supported on the first filter assembly end to form the mouth for influent flow and to therefrom coapt with the surrounding blood vessel to a site where the stocking is closed by rigid, non-rotational attachment to the elongate support member on a second filter assembly end to form a filtering means for filtering effluent flow from said filter assembly.

5,160,343

SURGICAL INSTRUMENTS HANDLE AND FORCEPS ASSEMBLY

Dale H. Brancel, Colleyville; Michael W. Freitas, Irving, and Clarence D. Zierhut, Garland, all of Tex., assignors to Dexide, Inc., Fort Worth, Tex.

Filed Sep. 9, 1991, Ser. No. 756,570
Int. Cl.[5] A61B *17/28*
U.S. Cl. 606—205 **7 Claims**



1. A surgical instruments handle, comprising:

(1) a body having forward and rearward sides;

(2) a receptacle defined on the forward side of said body for acceptance therethrough of a plurality of fingers of a human operator;

(3) a trigger-like abutment immediate the lower end of said handle for engagable finger contact as the body is held by the human operator;

(4) means for receipt of a surgical instrument body immediate the upper end of said handle, said surgical instrument body having an instrument manipulator disposed through said receiving means and engagable by said handle;

(5) a thumb-activatable surgical instrument operator having first and second ends, said surgical instrument operator being pivotally secured to said body on said body rearward side;

(6) means on said operator at said operator's first end for operationally engaging said manipulator to said operator; and

(7) a ring defined on the second end of said operator for introduction therethrough and snug engagement therein of a thumb of the human operator, said ring being pivotally secured to said second end of said operator.

5,160,344

TWO COMPONENT TEETHER

Donna L. Werton, 24664 Madison Ct. #256, Farmington Hills, Mich. 48335

Filed Sep. 13, 1991, Ser. No. 759,473
Int. Cl.[5] A61J *17/00*
U.S. Cl. 606—235 **3 Claims**

1. A method for using a teether, the teether being used to soothe the mouth parts of the mouth of a teething child, comprising the steps of:

disconnecting a first portion of the teether from a second portion of the teether;

cooling said first portion of the teether to a preselected temperature that is below room temperature;

connecting said first portion of the teether to said second portion of the teether; and

inserting only said first portion of the teether into the mouth of the teething child while said first and second portions remain connected so that the first portion of the teether serves to soothe the mouth parts of the teething child.

5,160,345

VAULTED INTRAOCULAR LENS HAVING CURVED SLANTED HAPTIC

Joseph A. Bragg, Milton, W. Va., assignor to Alcon Surgical, Inc., Fort Worth, Tex.

Continuation of Ser. No. 591,226, Oct. 1, 1990, abandoned. This application Nov. 5, 1991, Ser. No. 789,376
Int. Cl.[5] A61F *2/16*
U.S. Cl. 623—6 **7 Claims**

1. A posterior chamber intraocular lens comprising:

a lens body having an optical axis, two surfaces intersecting said optical axis and a periphery, at least a portion of said periphery lying in a first plane perpendicular to said optical axis;

at least one filamentous haptic means for contacting a portion of a posterior chamber of an eye attached to said lens body at a point of attachment on said periphery;

said at least one haptic means having a proximal segment

adjacent to said attachment point, a medial segment attached to and continuous with said proximal segment and a distal segment attached to and continuous with said medial segment, wherein said point of attachment is at a location on said lens body generally diametrically opposite said distal segment;

said at least one haptic means, projecting radially and circumferentially from said point of attachment along a curvilinear path in a space adjacent said first plane to a maximum distance from said optical axis;

at least a part of said distal segment lying at said maximum distance from said optical axis and constituting a tissue contacting element of said at least one haptic means, and at least a part of said proximal segment following a path generally corresponding to said periphery of said lens body;

said tissue-contacting element contacting a second plane parallel to said first plane and displaced from it along said optical axis, and

at least said medial segment of said at least one haptic means traversing a path concave toward said first plane, and avoiding intersection with said second plane.

5,160,346
PHOTOCHEMICAL AND THERMAL STABILIZATION OF POLYAMIDE FIBRE MATERIALS WITH TETRA-METHYL-PIPERIDINYL SUBSTITUTED TRIAZINE

Francesco Fuso, Münchenstein, and Gerhard Reinert, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

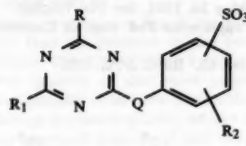
Filed Jul. 9, 1991, Ser. No. 727,514

Claims priority, application Switzerland, Jul. 12, 1990, 2324/90

Int. Cl.[5] D06M *13/35;* **D06P** *1/64, 3/24*

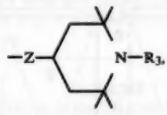
U.S. Cl. 8—442 **7 Claims**

1. A process for the photochemical and thermal stabilisation of polyamide fibre materials, which comprises treating dyed or undyed polyamide fibre materials with water-soluble triazine derivatives of the general formula



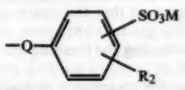
(1)

where R_1 is a radical of the formula



(2)

where R_3 is hydrogen or oxyloxygen, hydroxyl, lower alkyl, lower alkenyl, lower alkoxy, acyl or benzyl and Z is —O— or —(NR_4)—, where R_4 is hydrogen or lower alkyl, R_2 is hydrogen, halogen, lower alkyl, lower alkoxy, acylamino, carboxyl, an unsubstituted or halogen- or (lower alkyl)-substituted phenylsulfo, phenoxy, phenylthio or styryl radical or —SO_3M, Q is —O— or —(NR_4)—, R is halogen, lower alkyl, lower alkoxy, phenyl(lower alkoxy), cycloalkoxy, (lower alkyl)thio, phenyl(lower alkyl)thio, cycloalkylthio, mono(lower alkyl-)amino, di(lower alkyl)amino, phenyl(lower alkyl)amino, cycloalkylamino, phenoxy, phenylamino, phenylthio, phenyl, 1-azacycloalkyl, morpholino, R_1 or a radical of the formula



(3)

where M is hydrogen, an alkali metal, an alkaline earth metal, ammonium or an organic ammonium radical, and Q is as defined for the formula (1), the compounds of the formula (1) having not more than 2 —SO_3M substituents.

5,160,347
MULTICOLORED PIECE-DYED RUGS

Mark L. Kay, Villanova, Pa.; Rodger D. Loveless, Wilmar, and Bobby Vinson, Rison, both of Ark., assignors to Burlington Industries, Inc., Greensboro, N.C.

Continuation of Ser. No. 593,210, Oct. 5, 1990, abandoned. This application Jan. 2, 1992, Ser. No. 815,913

Int. Cl.[5] D06P *3/82, 5/00*

U.S. Cl. 8—481 **2 Claims**

1. A process of preparing a multicolor piece-dyed rug comprising the successive steps of:

(a) space dyeing a carrier dyeable polyester yarn in the presence of a carrier or using a high temperature dye fixation process optionally in the presence of a carrier;

(b) tufting into an area rug the space dyed yarn of step (a) and three different undyed synthetic yarns, an acid dyeable nylon, a cationic dyeable polyester and a disperse dyeable polyester, which are dyeable absent carrier with an acid, cationic and disperse dye, respectively; and

(c) dyeing in a single dyebath the area rug prepared in step (b) with an acid, cationic and disperse dye, respectively, corresponding to the respective dye affinities of the undyed synthetic yarns to dye the undyed synthetic fibers tufted in step (b) into three different colors without dyeing or bleeding the space dyed yarn and producing a multicolor piece-dyed area rug.

5,160,348
MIXTURES OF BLUE AZO DISPERSE DYESTUFFS

Manfred Hoppe, Kuerten; Dieter Wiegner, Odenthal; Klaus-Peter Sagner; Heinz D. Jordan, both of Leverkusen, and Horst Brandt, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 362,912, Jun. 8, 1989, abandoned. This application Dec. 17, 1991, Ser. No. 809,833

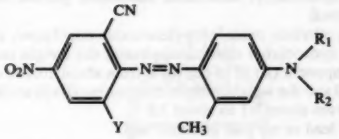
Claims priority, application Fed. Rep. of Germany, Jun. 24, 1988, 3821338

Int. Cl.[5] C09B *67/22;* **D06P** *1/18*

U.S. Cl. 8—639 **7 Claims**

1. A mixture of azo disperse dyestuffs having a hue angle h_{ab} of 290° to 300°, based on a polyester dyeing in a 1/1 standard depth of shade according to DIN 5033/Part 3, comprising

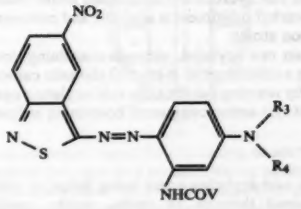
a) at least one dyestuff of the formula (I)



I

and

b) at least one dyestuff selected from the group consisting of compounds of the formula



II

wherein, independently of one another,

Y denotes NO_2 or CN,

V denotes alkyl, or alkoxy,

R_1 denotes alkyl, or alkoxyalkyl,

R_2 denotes chloralkyl, aryloxyalkyl, alkoxycarbonylalkyl, alkyl, aralkyl, alkoxyalkyl or alkenyl,

R_3 denotes alkyl, aralkyl, alkoxyalkyl, or aryloxyalkyl,

R_4 denotes alkoxycarbonylalkyl, alkyl or alkoxyalkyl,

wherein alkyl, alkenyl and alkoxy radicals, in whatever connection they are mentioned, are those with 1-4 C-atoms and aryl radicals, in whatever connection they are mentioned, are phenyl radicals which are unsubstituted or substituted by Cl or C_1-C_4-alkyl.

5,160,349

OLEFIN/MALEIC ANHYDRIDE COPOLYMER HETEROCYCLIC-AZOLES AS ANTIWEAR ADDITIVES, AND FUEL COMPOSITIONS

Angeline B. Cardis, Florence, and Carl E. Shanholtz, Lawrenceville, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Nov. 20, 1989, Ser. No. 438,835

Int. Cl.[5] C10L *1/22, 1/18*

U.S. Cl. 44—331 **6 Claims**

1. A fuel composition having antiwear properties comprising a liquid hydrocarbon fuel, a liquid oxygenated fuel or a blend of the liquid hydrocarbon fuel and the liquid oxygenated fuel and from 0.005 to 5 wt. % of a reaction product of a heterocyclic azole compound selected from the group consisting of benzotriazole, imidazole, or tolytriazole and a 1-olefinic copolymer containing 30 to 70 mole % of a maleic anhydride moiety wherein the 1-olefin contains between 6 and 18 carbon atoms.

5,160,350

FUEL COMPOSITIONS

Stephen H. Stoldt, Concord Township, Lake County, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 669,561, Mar. 14, 1991, abandoned, which is a continuation of Ser. No. 148,784, Jan. 27, 1988, abandoned. This application Dec. 6, 1991, Ser. No. 806,808

Int. Cl.[5] C10L *1/30*

U.S. Cl. 44—347 **22 Claims**

1. A fuel composition comprising:

(A) at least one hydrocarbon-soluble or dispersible alkali metal or alkaline earth metal containing composition,

(B) a mixture of:

(i) a hydrocarbyl substituted sulfonated phenol or salt thereof;

(ii) an ethylene oxide/propylene oxide copolymer, and

(iii) a hydrocarbyl substituted phenol, the weight ratio of component (B) (i) to (B) (ii) is from about 10:1 to about 1:10 and the weight ratio of component (B) (i) to (B) (iii) is from about 8:1 to about 1:8

(C) low lead or no lead gasoline, and

(D) at least on alcohol wherein the alcohol is monohydric containing up to 8 carbon atoms.

7. The composition of claim 1, additionally comprising:

(E) an ashless dispersant selected from the group consisting of;

(i) at least one hydrocarbyl-substituted amine wherein the hydrocarbyl substituent is aliphatic and contains at least 8 carbon atoms;

(ii) at least one acylated, nitrogen-containing compound having a substituent of at least 10 aliphatic carbon atoms made by reacting a carboxylic acid acylating agent with at least one amino compound containing at least one

—NH—

group, said acylating agent being linked to said amino compound through an imido, amido, amidine, or acyloxy ammonium linkage;

(iii) at least one nitrogen-containing condensate of a phenol or aldehyde, and an amino compound having at least one

—NH—

group;

(iv) at least one ester of a substituted carboxylic acid;

(v) at least one polymeric dispersant;

(vi) at least one hydrocarbon substituted phenolic dispersant; and

(vii) at least one fuel soluble alkoxylated derivative of an alcohol, phenol, or amine.

5,160,351

PROCESS OF AND APPARATUS FOR CLEANING A DEDUSTING ELECTROSTATIC PRECIPITATOR

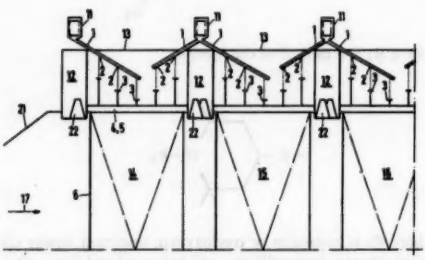
Hermann Schmidt, Bad Vilbel, and Wilhelm Leussler, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt/Main, Fed. Rep. of Germany

Filed May 24, 1991, Ser. No. 705,335

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1990, 4018487

Int. Cl.[5] B03C *3/76, 3/80*

U.S. Cl. 55—12 **16 Claims**



1. In a process of cleaning a dedusting electrostatic precipitator, said dedusting electrostatic precipitator having a plurality of collecting electrodes on which collecting surfaces are located, being structured so that voltage may be applied to the collecting electrodes and having a gas-flowless space above the collecting electrodes, said process of cleaning comprising the steps of feeding a coarse-grained cleaning dust into the dedusting electrostatic precipitator, collecting at least the coarse-grained cleaning dust electrostatically in the dedusting electrostatic precipitator to form a collected dust and periodically removing the collected dust, the improvement wherein the feeding of the coarse-grained cleaning dust into the electrostatic precipitator occurs so that the coarse-grained cleaning dust is fed only into the gas-flowless space, and further comprising the step of distributing the cleaning dust in and through the gas-flowless space.

10. In an apparatus for cleaning a dedusting electrostatic precipitator, said dedusting electrostatic precipitator comprising a plurality of collecting electrodes arranged in succession in a direction of gas flow in a plurality of fields (14, 15, 16) and having a gas-flowless space above the collecting electrodes, wherein the improvement comprises:

a plurality of downwardly-inclined distributing pipes (1) disposed above the fields (14, 15, 16) for supplying a coarse-grained cleaning dust to the gas-flowless space, said distributing pipes (1) having outlet openings (2) opening into the gas-flowless space,

feeding means (18) for supplying the coarse-grained cleaning dust to the distributing pipes;

distributing means (11) connected with said feeding means (18) for conducting said coarse-grained cleaning dust supplied by said feeding means into said downwardly-inclined distributing pipes (1), and

a plurality of baffle disks (3) disposed above the fields (14, 15, 16) and below the outlet openings (2) of the distributing pipes for deflecting and distributing said cleaning dust.

5,160,352

METHOD OF FORMING MEMBRANES USEFUL FOR SEPARATION OF GASES

Mitri S. Najjar, Wappingers Falls, and Martin D. Hilmar, Beacon, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Sep. 6, 1991, Ser. No. 755,898
Int. Cl.[5] B01D *53/22, 71/02*
U.S. Cl. 55—16 12 Claims

1. A method of separating a charge gas mixture containing a more permeable gas and less permeable gas which comprises

passing a charge gas mixture containing a more permeable gas and a less permeable gas into contact with a membrane of a high purity alumina containing aluminum-oxygen repeating units and characterized by a thickness of 8–200 microns and an arrow pore size distribution wherein at least about 70% of the pores have a Pore Radius of less than about 1000 Å;

maintaining a pressure on the charge side of said membrane greater than the pressure on the permeate side of said membrane thereby yielding a permeate containing increased quantity of said more permeable gas and decreased quantity of said less permeable gas and a retentate containing decreased quantity of said more permeable gas and an increased quantity of said less permeable gas;

recovering said permeate containing increased quantity of said more permeable gas and decreased quantity of said less permeable gas; and

recovering said retentate containing decreased quantity of said more permeable and an increased quantity of said less permeable gas.

5,160,353

GAS SEPARATION MEMBRANE WITH ULTRATHIN LAYER

Craig R. Gochanour, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Aug. 30, 1990, Ser. No. 575,266
Int. Cl.[5] B01D *53/22*
U.S. Cl. 55—158 46 Claims

1. A gas separation membrane comprising a thick polymer layer, and an ultrathin polymer layer, wherein:

said ultrathin layer is 10 to about 90 A thick; and provided that:

the selectivity of the polymer of said ultrathin layer is higher than the selectivity of the polymer of said thick layer; and

the selectivity of said membrane is greater or equal to the selectivity calculated for said thick layer, assuming said thick layer is defect-free.

5,160,354

PROCESS AND APPARATUS FOR EXTRACTION AND RECOVERY OF BLOWING AGENTS FROM POLYMERIC FOAMS

Michael R. Ascough, Oakville, Canada, assignor to Du Pont Canada Inc., Mississauga, Canada

Filed May 14, 1991, Ser. No. 700,011
Int. Cl.[5] B01D *47/00*
U.S. Cl. 55—37 9 Claims

1. A process for extraction and recovery of blowing agent contained within polymeric foam, said process comprising the steps of:

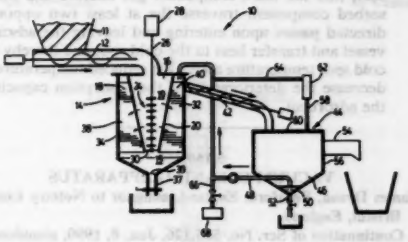
comminuting said polymeric foam in extraction liquid within a comminution zone, thereby releasing said blowing agent into said extraction liquid;

creating a vortex within said comminution zone, to force the comminuted polymeric foam downwards and out of said comminution zone and simultaneously concentrate said polymeric foam into a mass at the lower end of said comminution zone; and

passing the concentrated mass of polymeric foam directly into a quiescent zone in which said vortex is attenuated by attenuation means and allowing said concentrated polymeric foam to float to the surface of said quiescent zone.

2. An apparatus for extraction and recovery of blowing agent contained within polymeric foam, said apparatus comprising:

a comminution zone, into which extraction liquid and said polymeric foam is introduced, and wherein the upper end of said zone is of larger cross-sectional area and tapers to a lower end of a smaller cross-sectional area;



comminuting means located within said zone, said comminuting means adapted to comminute polymeric foam and to impart a vortex to said liquid and polymeric foam in comminution zone, thereby concentrating the comminuted polymeric foam in the region adjacent to the lower end of said zone;

a quiescent zone directly connected to the lower end of said comminution zone for fluid communication therewith; and

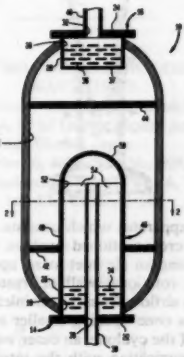
attenuating means, for attenuating the vortex, said attenuting means being located within said quiescent zone.

5,160,355

ADSORBENT VESSEL HAVING A CONVECTIVE HEAT EXCHANGER AND FLOW DEVELOPER

Karl O. Toppel, Flemington, N.J., assignor to The BOC Group, Inc., Murray Hill, N.J.

Filed Sep. 25, 1991, Ser. No. 765,609
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—269 16 Claims



1. In an adsorbent vessel for containing an adsorbent to form an adsorbent bed used in a pressure swing adsorption process wherein a component of a multi-component gas mixture is adsorbed to produce a product gas essentially free of the component, the adsorbent bed is regenerated by desorbing the component from the adsorbent bed, the adsorbent has a deteriorating adsorption capacity at a reduced temperature, and the pressure swing adsorption process produces a cold spot of the reduced temperature within the adsorbent bed, the adsorbent

vessel having an inlet through which the multi-component gas mixture and the desorbed component flow, to and from the adsorbent bed, respectively, the improvement comprising:

at least one elongated, convective heat exchanger, fabricated from a heat conductive material, located within the adsorbent vessel so as to extend into the cold spot, and having at least two oppositely directed, lengthwise extending passes;

the at least two oppositely directed, lengthwise extending passes in communication with one another and the inlet such that the multi-component gas mixture and the desorbed component traverse the at least two oppositely directed passes upon entering and leaving the adsorbent vessel and transfer heat to the cold spot and thereby raise cold spot temperature above the reduced temperature and decrease the deterioration of the adsorption capacity of the adsorbent.

5,160,356

VACUUM CLEANING APPARATUS

James Dyson, Bathford, England, assignor to Notetry Limited, Bristol, England

Continuation of Ser. No. 535,126, Jun. 8, 1990, abandoned, which is a continuation of Ser. No. 278,347, Dec. 1, 1988, abandoned, which is a continuation of Ser. No. 164,067, Mar. 3, 1988, Pat. No. 4,826,515, which is a continuation of Ser. No. 628,346, Jul. 6, 1984, abandoned, which is a continuation-in-part of Ser. No. 452,917, Dec. 27, 1982, abandoned, which is a continuation of Ser. No. 274,252, Jun. 16, 1981, abandoned. This application May 15, 1991, Ser. No. 702,101

Claims priority, application United Kingdom, Jun. 19, 1980, 8020041; Aug. 8, 1980, 8025960; Sep. 25, 1980, 8030964; Sep. 26, 1980, 8031121

Int. Cl.[5] B01D *45/12*

U.S. Cl. 55—345 **7 Claims**

1. A cleaning apparatus which consists essentially of:

(1) a circular cross-sectioned cyclone with a longitudinal axis comprising an air inlet at an upper end thereof, an interior dirt rotational wall of frusto-conical shape for receiving an airflow from the air inlet and maintaining its velocity to a cone opening smaller in diameter than the upper end of the cyclone, an outer wall and a cyclone air outlet communicating with the interior of the cyclone adjacent to the upper end of the cyclone; and

(b) a closed dirt receiving and collecting chamber connected to a portion of the outer wall of the cyclone wherein a cylindrical member, as a first portion of the receiving chamber is provided between the outer wall of the cyclone and a second portion of the receiving chamber, with a flexible seal positioned between the outer wall of the cyclone and the cylindrical member wherein the second portion of the receiving chamber provides a second, inverted cyclone around the axis having a frusto-conical shape increasing in diameter away from the cone opening and the cyclone with a minimum diameter of the second portion of the receiving chamber furthest from the cone opening of 3 times the diameter of the cone opening so that the airflow in the cyclone is in airflow communication with the receiving chamber through the cone opening for depositing dirt in the second portion of the receiving chamber by setting up a swirling, cyclonic flow of air in the second inverted cyclone of the second portion of the receiving chamber for retaining the separated dirt in the second portion of the receiving chamber by centrifugal forces before the cleaned airflow exits the receiving chamber through the cone opening and exits the cyclone through the cyclone air outlet, and wherein a bottom of the receiving chamber is provided where the separated dirt collects in the receiving chamber wherein an airflow is generated in the apparatus by a means for generating the airflow, the air passes sequentially through the air inlet, the cyclone, the receiving chamber including the second, inverted cyclone, the cone opening and the cyclone air outlet, the airflow rotating around the interior wall of the cyclone and the second cyclone of the receiving chamber and depositing the dirt in the receiving chamber and wherein the flexible seal allows the cyclone to be separated from the receiving chamber for dirt removal and then resealing.

5,160,357

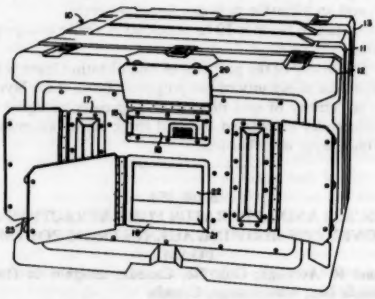
CONTAINER FOR ELECTRONIC EQUIPMENT

Sol Faber, Newton, Mass., assignor to GTE Government Systems Corporation, Waltham, Mass.

Filed Jan. 15, 1992, Ser. No. 821,505

Int. Cl.[5] B01D *46/10, 50/00*

U.S. Cl. 55—385.2 **1 Claim**



1. A container for providing environmental protection to electronic equipment, comprising:

a four sided frame;

front cover;

a rear cover;

an exhaust fan mounted on said rear cover an air filter mounted on said front cover to allow air to flow through said container;

a viewing port mounted on said front cover;

a first door for covering said viewing port;

an access port on said front cover for allowing manual access to said electronic equipment;

a set of elastic flaps mounted on said front cover covering said access port; and

a second door for covering said access port.

5,160,358

PROCESS FOR PRODUCING SILICA GLASS PLATE HAVING CONTROLLED REFRACTIVE INDEX DISTRIBUTION

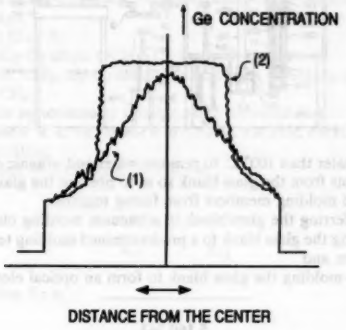
Osamu Kondo; Masukazu Hirata, and Mitsuzo Arii, all of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Co., Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 501,132, Mar. 29, 1990, abandoned. This application Apr. 17, 1991, Ser. No. 692,457

Claims priority, application Japan, Mar. 31, 1989, 1-78298; Mar. 31, 1989, 1-78301

Int. Cl.[5] C03B *20/00*

U.S. Cl. 65—18.2 7 Claims



1. A process for producing a silica glass plate having a controlled refractive index from a porous silica gel plate produced by the sol-gel method, which comprises the steps of:

(a) placing said porous silica gel plate in a reactor and reducing the pressure in said reactor to a substantially vacuum state to thereby remove water within said porous silica gel plate, the step being carried out at a temperature of 15° C. to 250° C.,

(b) introducing germanium tetrachloride gas into said reactor so as to directly contact said porous silica gel plate in a gaseous state at a reactor partial pressure appropriate to establish an absorption equilibrium between a desired concentration of germanium tetrachloride in said porous silica gel plate and the germanium tetrachloride gas introduced into said reactor, to thereby dope said porous silica gel plate and maintaining said partial pressure of germanium tetrachloride for a period of time sufficient to achieve the absorption equilibrium, the step being carried out at a temperature of 15° C. to 50° C.,

(c) reducing the partial pressure of germanium tetrachloride in step (b) to thereby desorb germanium tetrachloride from the surface of the porous silica gel plate and form a concentration distribution gradient of germanium tetrachloride between a higher level in the interior of said porous silica gel plate and a lower level in the outward portions thereof, the step being carried out at a temperature of 15° C. to 50° C.

(d) contacting said porous silica gel plate having said concentration distribution with water within or outside the reactor to thereby hydrolyze the germanium tetrachloride and fix it within said porous silica gel plate as germanium oxide, the step being carried out at a temperature of 10° C. to 100° C., drying the porous silica gel plate doped with germanium oxide, and

(e) calcining said porous silica gel plate from step (d) at a temperature of from 900° C. to 1200° C. to render it nonporous to thereby form a silica glass plate having a controlled refractive index.

5,160,359

APPARATUS AND METHOD FOR DRAWING AN OPTICAL FIBER FROM A SOLID BLANK

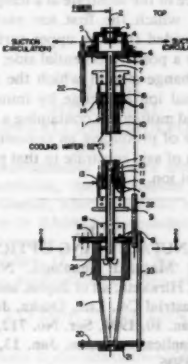
Dieter Strackenbrock, Stuttgart, and Bernd Lange, Kornwestheim, both of Fed. Rep. of Germany, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Jul. 8, 1991, Ser. No. 726,745

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1990, 4022131

Int. Cl.[5] C03B *37/027*

U.S. Cl. 65—3.12 18 Claims



1. A process for drawing an optical fiber from a solid optical fiber preform that is moved vertically through a furnace and is heated to a drawing temperature at its lower end, the fiber being drawn in a longitudinal drawing direction, comprising the steps of:

providing a cooling gas stream flowing in the longitudinal drawing direction, impressing a rotational flow, in addition to the longitudinal flow, on the cooling gas stream, and deflecting the cooling gas stream with the longitudinal and rotational flows in a direction opposite to the longitudinal drawing direction whereby the drawn fiber is cooled down from the drawing temperature by the cooling gas stream.

5,160,360

PROCESS FOR PRODUCING LOW-LOSS EMBEDDED WAVEGUIDE

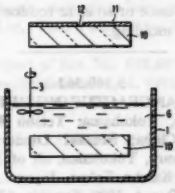
Masafumi Seki; Hideki Hashizume; Kenichi Nakama, and Shigeru Kobayashi, all of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Nov. 6, 1990, Ser. No. 609,545

Claims priority, application Japan, Nov. 6, 1989, 1-288511

Int. Cl.[5] C03C *21/00*

U.S. Cl. 65—30.13 13 Claims



1. A process for producing a low loss embedded waveguide, which comprises the following steps;

a first ion exchange step in which a glass substrate containing a monovalent ion and capable of undergoing ion exchange

is subjected to thermal ion exchange through an ion exchange-control film provided on an upper surface of said substrate and having a predetermined waveguide pattern formed therein, by immersing said substrate in a first molten salt containing a first monovalent ion capable of producing one of an increase and a decrease in the refractive index of said substrate;

an etching step in which said ion exchange-control film is removed from said substrate by etching;

while out of contact with said molten salt electric field applying annealing step in which a single electric field is applied to said substrate at substantially right angles to the the upper surface of the substrate at a temperature near the temperature at which the first ion exchange step was conducted, provided that the upper surface of said substrate is used as a positive potential side; and

a second ion exchange step in which the substrate is subjected to thermal ion exchange by immersing said substrate in a second molten salt containing a second monovalent ion capable of producing an opposing change in the refractive index of said substrate to that produced by said first monovalent ion.

5,160,361

METHOD OF MANUFACTURING OPTICAL ELEMENT

Jun Murata, Yao; Masaaki Sunohara, Nishinomiya, and Takayuki Kimoto, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 10, 1991, Ser. No. 712,710

Claims priority, application Japan, Jun. 13, 1990, 2-154790; Nov. 19, 1990, 2-313506

Int. Cl.[5] C03B *23/00*

U.S. Cl. 65—102 **7 Claims**

1. A method of manufacturing an optical element, which comprises the steps of disposing an optical element molding glass preform in a space between a first die and a second die confronting said first die, and obtaining the optical element through molding by heating and pressurization, said optical element molding glass preform having a columnar shape with a cylindrical portion and opposite end flat portions and forming, at each of its edges between said cylindrical portion and opposite end flat portions a radius of curvature larger than 0.05 mm by applying physical or chemical processing to the edges of said optical element molding glass preform, said step for molding the optical element molding glass preform by heating and pressurization being performed so as to reduce molding pressure more than once or so as to reduce said molding pressure to zero during molding.

5,160,362

PROCESS FOR MANUFACTURING OPTICAL ELEMENT

Kiyoshi Yamamoto, Yokohama; Tetsuo Kuwabara, Urawa; Isamu Shigyo, Chiba; Masaki Ohmori, Kawasaki, and Fumitaka Yoshimura, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 4, 1990, Ser. No. 621,981

Claims priority, application Japan, Dec. 6, 1989, 1-315447

Int. Cl.[5] C03B *23/00*

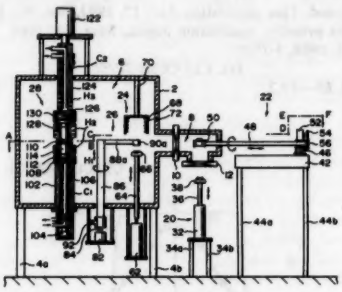
U.S. Cl. 65—102 **3 Claims**

1. A process for producing an optical element from a glass blank by heating the glass blank and press-molding it between molding members, comprising the steps of:

placing the glass blank in a vacuum transpose chamber;

maintaining a vacuum pressure in the transpose chamber at 10 Torr or less;

heating the vacuum transpose chamber to a temperature



greater than 100° C. to remove water and organic components from the glass blank so as to prevent the glass blank and molding members from fusing together;

transferring the glass blank to a vacuum molding chamber;

heating the glass blank to a predetermined molding temperature; and

press-molding the glass blank to form an optical element.

5,160,363

HERBICIDAL SULFONAMIDES

Robert T. Dean, Hudson Oaks, Tex., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

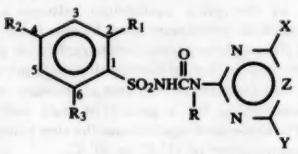
PCT No. PCT/US89/01953, § 371 Date Nov. 2, 1990, § 102(e) Date Nov. 2, 1990

Continuation-in-part of Ser. No. 193,510, May 12, 1988, abandoned. This PCT application May 11, 1989, Ser. No. 601,801

Int. Cl.[5] C07D *239/69*; A01N *43/54*

U.S. Cl. 71—92 **34 Claims**

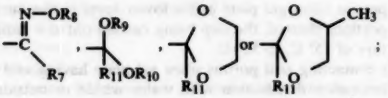
1. A compound of the formula:



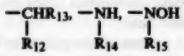
wherein

R is H or CH_3;

R_1 is NO_2, CO_2R_4, $C(O)R_5$, $S(O)_2R_6$,



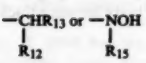
R_2 is



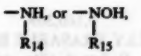
or CHO;

R_3 is H, OCH_3, CH_3 or Cl;

R_4 is C_1–C_3 alkyl, C_2–C_4 alkoxyalkyl, C_2–C_3 haloalkyl, allyl or propargyl;
R_5 is C_1–C_3 alkyl, C_2–C_4 alkoxyalkyl, C_3–C_4 cycloalkyl or cyclopropylmethyl;
R_6 is C_1–C_3 alkyl or C_2–C_4 alkoxyalkyl;
R_7 is C_1–C_3 alkyl, C_2–C_4 alkoxyalkyl, C_3–C_4 cycloalkyl, cyclopropylmethyl, C_1–C_2 alkoxy, CN or Cl;
R_8 is C_1–C_3 alkyl;
R_9 and R_{10} are independently C_1–C_2 alkyl;
R_{11} is H or CH_3;
R_{12} is H or CH_3;
R_{13} is CN, SCN, NH_2, $NHCH_3$, $N(CH_3)_2$, $NHC(O)CH_3$ or W_2R_{16};
R_{14} is C_1–C_3 alkyl, C_2–C_4 alkoxyalkyl or C_2–C_3 haloalkyl;
R_{15} is H, C_1–C_3 alkyl, C_2–C_4 alkoxyalkyl or C_2–C_3 haloalkyl;
R_{16} is H, C_1–C_6 alkyl, C_3–C_4 cycloalkyl or C_4–C_5 cycloalkylalkyl;
W_2 is O or S;
X is C_1–C_2 alkyl, OCH_3, Cl, or OCF_2H;
Y is H, CH_3, C_1–C_2 alkoxy, $NHCH_3$, or $N(CH_3)_2$; and
Z is CH;
and their agriculturally suitable salts; provided that
1) when X is Cl, then Y is OCH_3, OC_2H_5, $NHCH_3$, or $N(CH_3)_2$;
2) when X is OCF_2H, then R_2 is



3) when R_2 is



then R_1 is CO_2R_4;
4) When R_{16} is H, W_2 is O.

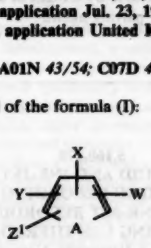
5,160,364

FUNGICIDES

Vivienne Anthony, Maidenhead; John M. Clough, Marlow; Paul deFraine, Wokingham; Christopher Godfrey, Bracknell, and Kevin Beautement, Wokingham, all of England, assignors to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 378,076, Jul. 11, 1989, Pat. No. 5,053,073, which is a division of Ser. No. 39,449, Apr. 17, 1987, Pat. No. 4,863,503. This application Jul. 23, 1991, Ser. No. 734,791
Claims priority, application United Kingdom, Apr. 17, 1986, 8609452
Int. Cl.[5] A01N *43/54*; C07D *403/06, 403/12*
U.S. Cl. 71—92 **10 Claims**

1. A compound of the formula (I):



(I)

or a stereoisomer thereof, wherein W is $R'O_2C$—C=CH—ZR_2, wherein R^1 and R^2, which are the same or different, are C_1–C_4 alkyl or C_1–C_4 fluoroalkyl containing one, two or three fluorine atoms and Z is either an oxygen or sulphur ato; A is a sulphur atom; X is optionally substituted pyrimidinyl, joined to the thienyl ring by a link selected from the group consisting of —OCH_2—, —CHhd $2CH_2$—, —CH=CH, —O— and —S—; and Y and Z^1 are selected from the group consisting of hydrogen, halo, C_1–C_4 alkyl, halo(C_1–$_4$)alkyl, cyano and formyl, the optional substituents for heteroaryl being selected from the gorup constisting of halogen, hydroxy, C_1–$_4$ alkyl, C_1–$_4$ alkoxy, halo(C_1–$_4$)alkyl, halo(C_1–$_4$)alkoxy, C_1–$_4$alkylthio, C_1–$_4$ alkoxy(C_1–$_4$)alkyl, C_3–$_4$ cycloalkyl, C_3–$_4$ cycloalkyl (C_1–$_4$)alkyl, aryl, aryloxy, aryl (C_1–$_4$)alkyl, aryl (C_1–$_4$)alkoxy, aryloxy (C_1–$_4$)alkyl, acyloxy, aryl (C_1–$_4$)alkyl, aryl (C_1–$_4$) alkoxy, aryloxy (C_1–$_4$alkyl, acyloxy, cyano, thiocyanato, nitro, —NR'R", —NHCOR', —NHCONR'R", —CONR'R", —COOR", —OSO_2R', —SO_2R', —COR', —CR'=NR" or —N=CR'R" in which R' and R" are independently hydrogen, C_1–$_4$ alkyl, C_1–$_4$ alkoxy, C_1–$_4$ alkylthio, C_3–$_6$ cycloalkyl, C_3–$_6$ cycloalkyl (C_1–$_4$)alkyl, phenyl or benzyl, X being in a positino on the thiophene ring adjacent to the W group.

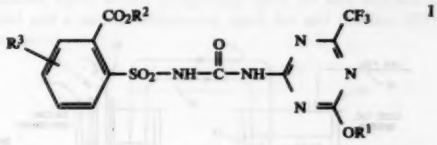
5,160,365

HERBICIDAL 1,3,5-TRIAZIN-2-YLUREIDOSULFONYLBENZOIC ESTERS

Horst Mayer, Ludwigshafen; Gerhard Hamprecht, Weinheim; Karl-Otto Westphalen, Speyer; Helmut Walter, Obrigheim, and Matthias Gerber, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 12, 1991, Ser. No. 758,552
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1990, 4029484
Int. Cl.[5] C07D *251/42*; A01N *43/66*
U.S. Cl. 71—93 **8 Claims**

1. A 1,3,5-triazin-2-ylureidosulfonylbenzoic ester of the formula I



I

where
R^1 is methyl or ethyl;
R^2 is n-propyl, i-propyl, 2-haloethyl or 2-methoxyethyl and, when R^3 is methyl or methoxy, is methyl or ethyl;
R^3 is hydrogen, fluorine, chlorine, methyl or methoxy, or its salts thereof which can be used in agriculture.

5,160,366

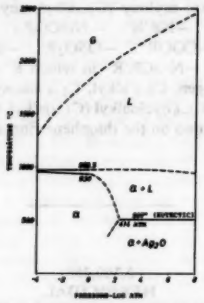
SILVER-METAL OXIDE COMPOSITE MATERIAL AND PROCESS FOR PRODUCING THE SAME

Akira Shibata, 298-45, Takada-cho, Kohoku-ku, Yokohama-shi, Kanagawa-ken, Japan, assignor to Sumico Management Planning Company, Ltd., Tokyo and Akira Shibata, Yokohama, both of, Japan

Continuation-in-part of Ser. No. 633,667, Dec. 26, 1990, abandoned. This application Mar. 14, 1991, Ser. No. 668,330
Claims priority, application Japan, Dec. 26, 1989, 1-338005; Jan. 9, 1990, 2-2240
Int. Cl.[5] C22C *19/12*
U.S. Cl. 75—232 **3 Claims**

1. A silver-metal oxide composite material comprising a silver matrix, from 1 to 20% by weight, in terms of elemental metal, of an oxide of (a) at least one element selected from the group consisting of Sn, Cd, Zn and In, the oxide of the (a) element being dispersed in the form of fine particles with a

particle size of not more than about 0.1 μm uniformly throughout the silver matrix from the surface to the core thereof and



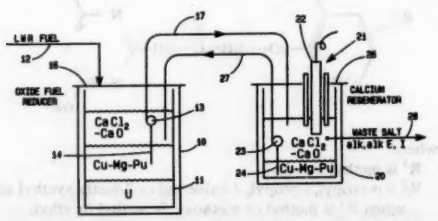
being bound to the silver matrix with no space left between the oxides and the silver matrix.

5,160,367

SALT TRANSPORT EXTRACTION OF TRANSURANIUM ELEMENTS FROM LWR FUEL

R. Dean Pierce, Naperville; John P. Ackerman, Downers Grove; James E. Battles, Oak Forest; Terry R. Johnson, Wheaton, and William E. Miller, Naperville, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 3, 1991, Ser. No. 770,385
Int. Cl.[5] C22B *60/00*
U.S. Cl. 75—397 **30 Claims**



1. A process of separating transuranium actinide values from uranium values present in spent nuclear oxide fuels containing rare earth and noble metal fission products as well as fission products of alkali metals, the alkaline earth metals and iodine, comprising reducing the oxide fuel with Ca metal in the presence of Ca halide and a molten Cu—Mg alloy to precipitate uranium values and some of the noble metal fission products leaving the Cu—Mg alloy having transuranium actinide values and rare earth fission product values and some of the noble metal fission products dissolved therein and leaving Ca halide having fission products of alkali metals and the alkaline earth metals and iodine dissolved therein, separating the Ca halide and the fission products contained therein from the uranium values and Cu—Mg alloy, oxidizing any Ca metal present in the Cu—Mg alloy to the halide and separating same from the Cu—Mg alloy, contacting the Cu—Mg alloy having transuranium actinide values and rare earth fission product values and the noble metal fission products dissolved therein with a transport salt including Mg halide to transfer Mg values from the transport salt to the Cu—Mg alloy while transuranium actinide and rare earth fission product values transfer from the Cu—Mg alloy to the transport salt, contacting the transport salt having the transuranium actinide and rare earth fission product values dissolved therein with a Mg-containing alloy to transfer Mg values from the alloy to the transport salt while the transuranium actinide and rare earth fission product values dissolved in the salt are reduced and transferred to the Mg-containing alloy, whereby an alloy is formed having transuranium actinide and rare earth fission product values therein while precipitated uranium values along with precipitated noble metal fission product values are available for separation from the Cu—Mg alloy.

5,160,368

BIODEGRADABLE PACKAGES FOR FAST FOOD AND METHOD OF PREPARING THE SAME

Juan A. Begovich, Progreso 124, Coyoacan, 04010 Mexico, D.F., Mexico

Continuation of Ser. No. 670,558, Mar. 18, 1991, abandoned. This application Mar. 16, 1992, Ser. No. 851,121
Int. Cl.[5] C08L *89/00*
U.S. Cl. 106—154.1 **9 Claims**

1. A biodegradable package for fast food which comprises a heat-molded body of a moldable composition which consists essentially of an admixture of flour from edible gramineous plants, crushed gramineous hay, a minor proportion of preserving agents, and a plasticizing agent for providing a starting moldable dough said body having a thickness from about 1 mm to about 10 mm.

5,160,369

MECHANICALLY ERASABLE BALLPOINT INK

Dean B. Parkinson, Redwood City, and Orton D. Bergren, Menlo Park, both of Calif., assignors to SRI Inc., Menlo Park, Calif.

Filed Feb. 21, 1991, Ser. No. 659,776
Int. Cl.[5] C09D *11/18*
U.S. Cl. 106—19 R **13 Claims**

1. An erasable ballpoint ink compositions comprising:
a) about 15% to about 80% by weight of a hydrocarbon solvent,
b) about 1% to about 15% by weight of a colorant,
c) about 4% to about 40% by weight of a thermoplastic hydrophobic hydrocarbon block copolymer, and
d) about 5% to about 40% by weight of a fatty acid ester of polyalkylene ether parting agent.

5,160,370

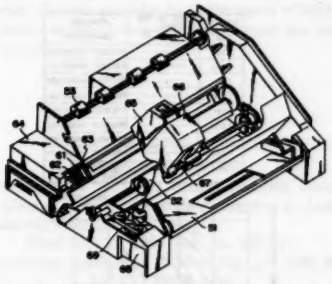
RECORDING LIQUID AND INK-JET RECORDING METHOD MAKING RECORDING UNIT, INK CARTRIDGE, AND INK-JET RECORDING APPARATUS MAKING USE THEREOF

Yuko Suga, Tokyo, and Hiromichi Noguchi, Atsugi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 456,728, Dec. 26, 1989, abandoned. This application May 14, 1991, Ser. No. 700,949
Claims priority, application Japan, Dec. 27, 1988, 63-331454; Dec. 27, 1988, 63-331455; Nov. 24, 1989, 1-305245
Int. Cl.[5] C09D *11/00*
U.S. Cl. 106—20 **9 Claims**

1. A recording liquid comprising a pigment, a water-soluble resin, a water-soluble organic solvent, and water, wherein;
of the water-soluble resin, water-soluble resin that is dissolved in the recording liquid without being absorbed on

the pigment is contained in an amount of not more than 2% by weight; and



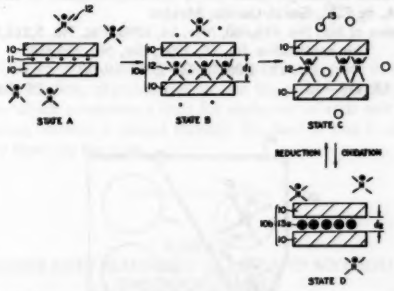
the water-soluble organic solvent comprises (i) an aliphatic monohydric alcohol, and (ii) at least one of a polyhydric alcohol and an alkyl ether thereof.

5,160,371

DISPLAY COMPOSITION, COLORING PIGMENT, AND RECORDING MATERIAL

Kengo Ito, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 25, 1990, Ser. No. 514,290
Claims priority, application Japan, Apr. 28, 1989, 1-111763
Int. Cl.[5] C07D *11/02*; C07C *1/02*
U.S. Cl. 106—19 R **3 Claims**



1. A display composition which comprises a dye, which will undergo a color development, a color fading, and a color change in response to an oxidation-reduction reaction, and a clay mineral in which quaternary ammonium ions are bound between layers through ion exchange, said display composition undergoing reversible color development and color fading through the oxidation and reduction of said dye, the oxidation causing said dye to form a color and to be bound between the layers of said clay mineral through ion exchange with said quaternary ammonium ions, the reduction causing the dye to disorder and to be desorbed out of the interlaminar space of the clay mineral and also causing the quaternary ammonium ions to be bound again between the layers through ion exchange.

5,160,372

AQUEOUS INK JET INKS CONTAINING ESTER DIOL AND AMIDE DIOL COSOLVENTS

Howard Matrick, Highlands, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 13, 1991, Ser. No. 714,877
Int. Cl.[5] C09D *11/00*
U.S. Cl. 106—19 R **25 Claims**

1. An aqueous ink jet ink composition comprising:

(a) an aqueous carrier medium,

(b) a pigment dispersion or dye; and

(c) a penetrant which is an ester diol or amide diol compound having a solubility in water of at least 4.5 parts in 100 parts of water at 25° C. and represented by the formula:

$$HOCH_2CR'R''CH_2XCCR'R''CH_2OH$$

wherein

R′=—CH_3, —C_2H_5, —C_3H_7, or —C_4H_9 and

R″=—CH_3, —C_2H_5, or —C_3H_7 and

X=O or N—Y wherein Y=H, CH_3, CH_2CH_3 or CH_2CH_2OH.

5,160,373

ELECTROLESS PLATING BATH

Atsuo Senda, Otsu; Takuji Nakagawa, Kyoto, and Yoshihiko Takano, Nagaokakyo, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jun. 12, 1991, Ser. No. 713,782
Claims priority, application Japan, Apr. 26, 1991, 3-96919
Int. Cl.[5] C23C *18/34*
U.S. Cl. 106—1.29 **5 Claims**

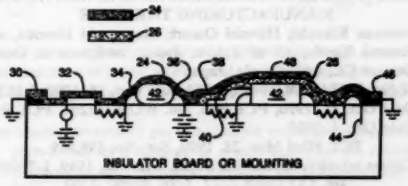
1. An electroless plating bath for depositing a metal selected from the group consisting of Ni, Zn, As, Cd, In, Sb, Pb and alloys thereof, comprising a titanium (III) compound as a reducing agent, a first complexing agent for said depositing metal and a second complexing agent for said titanium (III) compound.

5,160,374

PROCESS AND APPARATUS FOR PREVENTING THE PULSE DISCHARGE OF INSULATORS IN IONIZING RADIATION

Arthur R. Frederickson, Carlisle, Mass.; Joseph E. Nanevicz, Palo Alto; Jeffrey S. Thayer, Simi Valley, and Dean B. Parkinson, Redwood City, all of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 24, 1990, Ser. No. 557,285
Int. Cl.[5] C04B *14/36*; H01B *1/20*; C09K *3/16*
U.S. Cl. 106—401 **31 Claims**



1. A process for substantially reducing electric discharges on circuit boards exposed to ionizing radiation, said process comprising the steps of: depositing a semi-insulating coating on electrical insulators, on electrical circuit boards, and on electrical insulating material thereon and

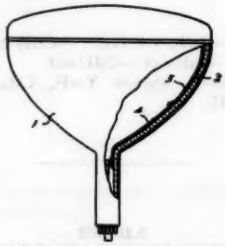
connecting the semi-insulating coating to a suitable electric potential point close to ground.

5,160,375

INTERNAL COATING MATERIALS FOR A CATHODE RAY TUBE

Shiro Otaki, Tokyo, Japan, assignor to Acheson Industries, Inc., Port Huron, Mich.

Filed Feb. 2, 1990, Ser. No. 474,472
Claims priority, application Japan, Feb. 15, 1989, 1-35437
Int. Cl.[5] C04B *14/06*
U.S. Cl. 106—475 **5 Claims**



1. A coating composition for a cathode ray tube, consisting essentially of:

silica powder which has been fused during the process of flame spraying,

said silica powder having an average particle size of about 0.02 to about 15 microns,

electrically conductive graphite powder,

with a pigment ratio of silica to graphite within the range of 0.1 to 15,

an organic thickening agent,

water glass,

and water,

said coating composition having a viscosity within the range of about 270 to about 850 cps; and wherein

said coating is applied at a thickness of

about 3 to about 50 microns, and provides an electric resistance of 0.075 to 50,000 ohm cm.

5,160,376

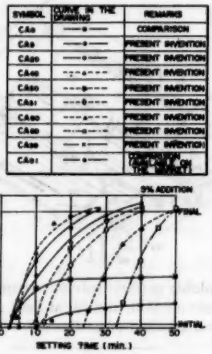
CEMENT SETTING ACCELERATOR AND METHOD OF MANUFACTURING THE SAME

Masatsune Kikuchi; Hiroshi Omori; Hatsutoshi Hosoda, and Susumu Kouda, all of Tokyo, Japan, assignors to Onoda Cement Co., Ltd., Onoda, Japan

PCT No. PCT/JP90/00413, § 371 Date Oct. 15, 1990, § 102(e) Date Oct. 15, 1990, PCT Pub. No. WO90/11257, PCT Pub. Date Oct. 4, 1990
PCT Filed Mar. 28, 1990, Ser. No. 598,639
Claims priority, application Japan, Mar. 28, 1989, 1-76049
Int. Cl.[5] C04B *7/32, 7/36, 40/00, 2/00*
U.S. Cl. 106—819 **2 Claims**

1. A cement setting accelerator, comprising:

100 parts by weight of a sintered powdery material prepared by pulverizing a sintered body containing 4.25 to 85% of $3CaO.2Na_2O.5Al_2O_3$, 0.75 to 15% of Na_2SO_4, and at most 95% of $Na_2O.Al_2O_3$, said sintered body being obtained by sintering at 1150° C. or more a raw material containing 19.7 to 36.9% of Na_2O, 54.0 to 61.8% of Al_2O_3, 0.9 to 17.8% of CaO, and 0.4 to 9.5% of SO_3;



5 to 70 parts by weight of an alkali metal carbonate powder; and

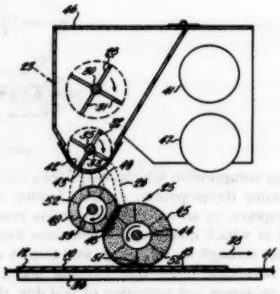
at most 170 parts by weight of a lime powder.

5,160,377

APPARATUS FOR PREVENTING STICKING OF STACKED FOOD PRODUCTS

Ezequiel d. Montemayor, Garza Garcia, Mexico; Marina T. Ollervides, Northbridge, Calif., and Rita M. Gonzalez, Col. Colinas de San jeronimo Mty., Mexico, assignors to Gruma S.A. de C.V., Garza Garcia, Mexico

Division of Ser. No. 614,660, Nov. 14, 1990, Pat. No. 5,118,515.
This application Jul. 25, 1991, Ser. No. 735,598
Int. Cl.[5] B05C *1/02, 1/08, 19/00*
U.S. Cl. 118—13 **16 Claims**



1. Apparatus for depositing substantially uniformly distributed, discrete, separated particles of dry edible powder on the surface of a tortilla to prevent sticking of tortillas in a packaged stack thereof, comprising

a) means for storing, sifting and discharging dry, edible powder partially or wholly in clump form onto at least one of a pair of rollers acting to form said powder into separate discrete particles, said rollers including;

b) a rotating loading roller composed of porous, non-reticulated, open cell resilient foam; and

c) a second rotating deposition roller also composed of porous, non-reticulated, open cell foam in compressive contact with said loading roller, wherein said deposition roller receives powder from said loading roller into the pores of said deposition roller in which said powder is reservoired in separated, discrete particles; and

d) conveyor means for carrying tortillas in compressive rolling contact with said deposition roller;

whereby said dry edible powder is uniformly distributed in separate, discrete particles from the pores of said deposition roller in which it is reservoired onto the surface of said tortillas.

5,160,378

WASHING DEVICE

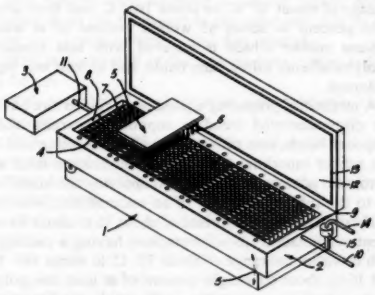
Jukka Tuunanen; Ale Narvanen, both of Helsinki, Finland, and Mario Geysen, Clayton, Australia, assignors to Labsystems Oy, Helsinki, Finland

Filed Sep. 21, 1990, Ser. No. 585,912

Claims priority, application Finland, Sep. 25, 1989, 894522

Int. Cl.[5] B08B *3/04*

U.S. Cl. 134—25.1 **15 Claims**



14. Method for washing of rods attached to a plate in rows with a solution, characterized in that the plate is placed in a basin which comprises a duct for each row of rods and that washing solution is passed through the duct so that it washingly flows by the rods.

5,160,379

FE-BASE SOFT MAGNETIC ALLOY AND METHOD OF PRODUCING SAME

Yoshihito Yoshizawa; Kiyotaka Yamauchi, and Shigeru Oguma, all of Kumagaya, Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Continuation of Ser. No. 326,860, Mar. 21, 1989, abandoned, which is a division of Ser. No. 103,250, Oct. 1, 1987, abandoned. This application Jan. 22, 1991, Ser. No. 643,104

Claims priority, application Japan, Dec. 15, 1986, 61-297938; Mar. 13, 1987, 62-58577; Jun. 1, 1987, 62-137995

Int. Cl.[5] C21D *1/04*

U.S. Cl. 148—108 **6 Claims**

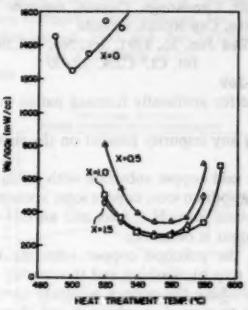
1. A method of producing a Fe-base soft magnetic alloy having the composition represented by the general formula:

$$(Fe_{1-a}M_a)_{100-x-y-z-\alpha}Cu_xSi_yB_zM'_\alpha$$

wherein M is Co and/or Ni, M' is at least one element selected from the group consisting of Nb, W, Ta, Zr, Hf, Ti and Mo, and a, x, y, z and α respectively satisfy $0 \leqq a \leqq 0.5$, $0.1 \leqq x \leqq 3$, $0 \leqq y \leqq 30$, $0 \leqq z \leqq 25$, $5 \leqq y+z \leqq 30$ and $0.1 \leqq a \leqq 30$, at least 50% of the alloy structure being occupied by fine crystalline particles having an average particle size of 1,000Å or less, comprising the steps of:

(a) rapidly quenching a melt of the above composition to provide an amorphous alloy; and

(b) heat-treating said amorphous alloy at 450–700° C. for 5 minutes to 24 hours to generate fine crystalline particles



having an average particle size of 1000Å or less in the alloy structure.

5,160,380

PROCESS FOR IMPROVED PREPARATION OF TREATMENT GAS IN HEAT TREATMENTS

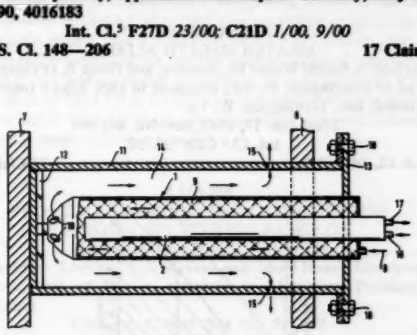
Peter Vocke, München; Thomas Mahlo, Geretsried, and Reinhard Strigl, München, all of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed May 17, 1991, Ser. No. 701,156

Claims priority, application Fed. Rep. of Germany, May 19, 1990, 4016183

Int. Cl.[5] F27D *23/00*; C21D *1/00, 9/00*

U.S. Cl. 148—206 **17 Claims**



1. A process for the preparation of treatment gas for use in heat treatment of metal workpieces, said treatment gas consisting essentially of (a) CO, H_2 and N_2, or (b) H_2 and N_2, comprising:

producing treatment gas in a catalyst retort at a temperature above that of a furnace in which said catalyst retort is positioned, said furnace operating at a temperature of 600°–800° C. by

surrounding said catalyst retort within said furnace by a shield;

discharging the produced treatment gas from said catalyst retort into a space defined between said shield and said retort; and

discharging said produced treatment gas from said space into said furnace.

5,160,381

METHOD FOR FORMING ARTIFICIALLY AND RAPIDLY PATINA ON COPPER, PRODUCTS THEREOF AND SOLUTIONS THEREFOR

Jocelyn Gervais, Cap-Rouge, Canada, assignor to Fumigation Maritime Ltée, Cap-Rouge, Canada

Filed Jun. 26, 1991, Ser. No. 721,295
Int. Cl.[5] C23C *22/00*
U.S. Cl. 148—269 10 Claims

1. A method for artificially forming patina on copper comprising:

a) removing any impurity present on the surface of copper substrate;

b) polishing said copper substrate with an aqueous solution containing sodium ions, copper ions, acetate ions, chlorine ions, sulphate ions, H+ ions and an OH− ions until a brown colour is obtained;

c) washing the polished copper substrate having brown colour of step b), washing and thoroughly drying; and

d) gently brushing the copper substrate having been dried according to step c), washing it and thoroughly drying said washed substrate; and

e) submitting said copper substrate after having been thoroughly dried according to step d), to a filtered aqueous solution containing copper carbonate, ammonium chloride, copper acetate, arsenic trioxide, copper nitrate and hydrochloric acid until the desired patinated copper substrate is obtained,

wherein the aqueous solution used in step b) is obtained by mixing from 100 to 150 ml of concentrated acetic acid, 500 to 600 grams of copper sulfate, 80 to 120 grams of sodium chloride, 11 to 13 grams of sodium hydroxide and 11 to 15 grams of copper acetate in 4 liters of distilled water, and

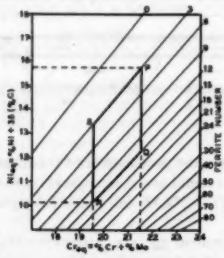
the aqueous solution used in step e) is obtained by mixing from 300 to 360 ml of concentrated hydrochloric acid, 100 to 160 grams of copper carbonate, 350 to 420 grams of ammonium chloride, 375 to 450 grams of copper acetate 20 to 75 grams of arsenic trioxide, and 10 to 25 grams of copper nitrate in 6 liters of distilled water.

5,160,382

HEATER SHEATH ALLOY

Gaylord D. Smith; Walter H. Wendler, and David B. O'Donnell, all of Huntington, W. Va., assignors to Inco Alloys International, Inc., Huntington, W. Va.

Filed Jan. 17, 1992, Ser. No. 882,084
Int. Cl.[5] C22C *38/50*
U.S. Cl. 148—327 12 Claims



1. A weldable, oxidation- and corrosion-resistant alloy which obtains, upon oxidation, a protective oxide layer ranging in color from dark gray to black, the alloy consisting essentially of, by weight, from about 8.75–15.5% nickel, about 19.5–21.0% chromium, about 0.30–0.50 manganese, about 0.50–2.0% silicon, about 0.25–0.60% aluminum, about 0.25–1.0% titanium, up to about 0.05% carbon, up to about 0.005% sulfur, up to about 0.75% copper, up to about 1.0% cobalt, up to about 1.0% molybdenum, up to about 0.02% phosphorus, about 0.001–0.015% calcium plus magnesium and remainder essentially iron, wherein the Ferrite Number is between 3 and 15.

5,160,383

TIRE HAVING IDENTIFICATION LABEL AFFIXED THERETO

Robert J. Gartland, Youngstown, and William H. Thomson, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 17, 1990, Ser. No. 583,102
Int. Cl.[5] B60C *13/00*
U.S. Cl. 152—510 18 Claims

1. A pneumatic tire having an identification label affixed thereto which is comprised of an outer circumferential tread, a supporting carcass therefor, two-spaced beads, two rubber sidewalls connecting said beads, and a rubber innerliner: wherein the identification label is affixed to the rubber innerliner and wherein the identification label is comprised of from about 35 weight percent to about 90 weight percent syndiotactic 1,2-polybutadiene having a melting point which is within the range of about 70° C. to about 160° C. and from about 10 weight percent to about 65 weight percent of at least one polydiene rubber which is cocured with said syndiotactic 1,2-polybutadiene, sulfur, zinc oxide, and at least one pigment or colorant.

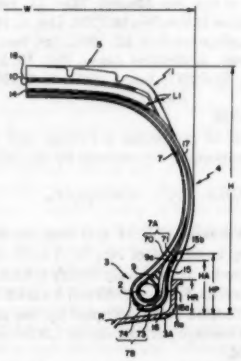
2. A method of preparing a pneumatic rubber tire having an outer circumferential tread, a supporting carcass therefor, two-spaced beads, two rubber sidewalls connecting said beads, and a rubber innerliner having an identification label affixed thereto, said process comprising (a) applying the identification label to the rubber innerliner of an uncured tire, wherein the identification label is comprised of about 35 to about 90 weight percent syndiotactic 1,2-polybutadiene having a melting point which is within the range of about 70° C. to about 160° C. and about 10 to about 65 weight percent of at least one polydiene rubber which is cocurable with said syndiotactic 1,2-polybutadiene, sulfur, zinc oxide, and at least one pigment or colorant: and (b) curing the tire.

5,160,384

HIGH SPEED HEAVY DUTY TIRE INCLUDING BEAD PART WITH SIDE PACKING RUBBER

Kiyoshi Ueyoko, Osaka, and Hiroshi Hoshino, Kobe, both of Japan, assignors to Sumitomo Rubber Industries, Limited, Hyogo, Japan

Filed Dec. 21, 1990, Ser. No. 632,006
Claims priority, application Japan, Dec. 28, 1989, 1-344638
Int. Cl.[5] B60C *15/06, 13/00*
U.S. Cl. 152—454 2 Claims



1. A high speed tire for heavy duty vehicles comprising: a carcass in a radial structure composed of a plurality of

inner plies and a plurality of outer plies, each of said plurality of inner plies having a main body part extending from a tread part through side wall parts to a bead core in each of two bead parts, and a folding-back part folded back at each edge of the main body part around the bead core from axially inside to outside, said outer plies having a wrapping part enclosing the folding-back part around the bead core from axially outside to inside at each edge of a main body extending from the tread part through the side wall parts to the bead core;

a belt layer disposed outside of the carcass in the tire radial direction;

tapered bead apex rubbers each extending from the bead core outward in the radial direction between the main body part and the folding-back part;

side packing rubbers of small thickness each extending radially outwardly along the outside surface of the main body, each side packing rubber terminating on the outer side of the bead core at an upper end of a reinforcement filler extending on the bottom surface of the wrapping part; and

side wall rubbers each covering a packing rubber and extending from the bead part to the side wall part so as to form the outside surface of the tire; wherein

the 100% modulus MP of the side packing rubber is 53–95 kg/sq.cm,

the 100% modulus MA of the bead apex rubber is 78–120 kg/sq.cm,

the 100% modulus MS of the side wall rubber is 14–50 kg/sq.cm, and

the 100% modulus MP, MA, MS are in the relation of MS<MP<MA.

5,160,385

HEAVY DUTY PNEUMATIC TIRES

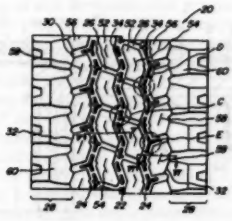
Akihito Goto, Kodaira, and Yasutaka Enoki, Sayama, both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Aug. 6, 1990, Ser. No. 562,984

Claims priority, application Japan, Aug. 8, 1989, 1-203805; Aug. 21, 1989, 1-214555; Aug. 21, 1989, 1-214556

Int. Cl.[5] B60C *11/11*

U.S. Cl. 152—209 R **13 Claims**



1. A heavy duty pneumatic tire comprising: a tread having a block pattern composed of island portions and groove portions including a circumferential groove and a transverse groove, protrusions for the prevention of stone capturing disposed in the bottoms of the grooves, wherein a protrusion disposed at an intersect portion between at least two grooves among said protrusions is provided with a projected part protruding in an extending direction of each of said circumferential and transverse grooves and disconnected from any island portion of said block pattern.

5,160,386

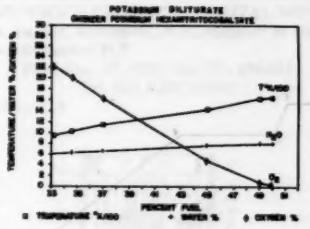
GAS GENERANT FORMULATIONS CONTAINING POLY(NITRITO) METAL COMPLEXES AS OXIDANTS AND METHOD

Gary K. Lund, Ogden, Utah, and Mikel R. Stevens, Fayetteville, Ark., assignors to Morton International, Inc., Chicago, Ill.

Filed Nov. 4, 1991, Ser. No. 787,500

Int. Cl.[5] C06B *25/00*

U.S. Cl. 149—88 **31 Claims**



1. A solid composition for generating a nitrogen-containing gas including a fuel and an oxidizer therefor, wherein said oxidizer comprises an inorganic compound having a poly(nitrito) transition metal complex anion.

5,160,387

EMULSION EXPLOSIVE

Vladimir Sujansky, Burwood, Australia, assignor to ICI Australia Operations Proprietary Limited, Melbourne, Australia

Filed Nov. 16, 1990, Ser. No. 614,456

Claims priority, application Australia, Nov. 16, 1989, PJ7440

Int. Cl.[5] C06B *45/00*

U.S. Cl. 149—2 **27 Claims**

1. An emulsion explosive comprising a discontinuous oxygen-releasing salt phase, a continuous fuel phase and an emulsifier blend, said emulsifier blend comprising a first emulsifier component consisting of at least one emulsifier comprising a lipophilic moiety, being a polymer of a C_2 to C_6 olefin, and a hydrophilic moiety, being derived from an amine wherein the HLB of the first emulsifier component, as herein defined, is in the range of from 1.0 to 1.3 and a second emulsifier component and wherein the HLB of the emulsifier blend, as herein defined is in the range of from 1.4 to 3.0.

5,160,388

PROCESS FOR PRODUCING CATHODES FOR CATHODIC SPUTTERING BASED ON ALUMINIUM-SILICON ALLOYS

Jean-Marc Legresy, St. Egreve, and Marc-Henri Marticou, Foix, both of France, assignors to Aluminium Pechiney, France

Filed Jul. 9, 1991, Ser. No. 727,043

Claims priority, application France, Jul. 10, 1990, 90 093976

Int. Cl.[5] C22F *1/04*; C23C *14/00*

U.S. Cl. 148—552 **6 Claims**

1. Process for producing fine grain targets for cathodic sputtering of aluminum in vacuo, said process comprising the following steps:

(a) producing from aluminum having a purity of at least 99.99% an aluminum-silicon alloy containing 0.05% to 2% silicon, the balance being aluminum;

(b) molding said aluminum-silicon alloy in the form of disks or semicontinuously casting in the form of billets and cutting the billets into disks,

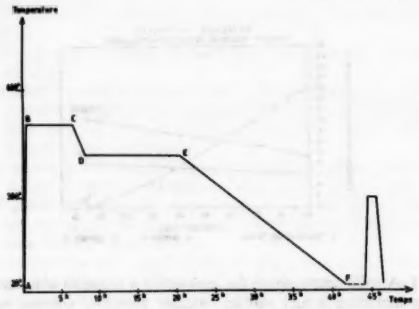
(c) homogenizing the disks at a temperature between 450° and 570° C. for at least four hours to pass precipitated silicon into solid solution;

(d) subjecting the disks to controlled cooling at a rate com-

prised between 10° C./hour and 200° C./hour to a fixed temperature between 330° and 450° C.,

(e) optionally maintaining the disk at said fixed temperature for at least one hour so as to complete precipitation and spheroidization of the silicon;

(f) controlled cooling at a rate comprised between 5° C./hour and 100° C./hour to ambient temperature;



(g) carrying out deformation to reduce the thickness of the disk, while simultaneously homogeneously increasing dimensions of the disk in all directions perpendicular to said thickness; and

(h) carrying out a recrystallization treatment at a temperature between 300° and 350° C. for a time comprised between five minutes and two hours and cooling to ambient temperature.

5,160,389

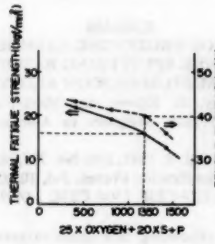
FLEXIBLE TUBE FOR AUTOMOTIVE EXHAUST SYSTEMS

Shunichiro Akiyama, Jyoetsu, and Hisao Fujikawa, Nishinomiya, both of Japan, assignors to Nippon Stainless Steel Co., Ltd., Tokyo and Sumitomo Metal Industries, Ltd., Osaka, both of, Japan

Continuation of Ser. No. 476,721, Jan. 24, 1990, abandoned. This application Jul. 19, 1991, Ser. No. 732,770

Int. Cl.[5] C22C *38/44*

U.S. Cl. 148—327 **12 Claims**



1. A flexible tube for the exhaust system of an automobile made from a stainless steel consisting essentially of, by weight %:

C: at most 0.03%,	Si: 0.1–2.0%,
Mn: at most 2.0%,	Cr: 18–26%,
Ni: 16–30%,	Mo: 1.0–3.0%,
Ti: 0–0.25%,	Nb: 0–1.5%, and

a remainder of Fe and incidental impurities, of the impurities, the amount of oxygen being ≦50 ppm, the amount of S being ≦20 ppm, and the amount of P being ≦150 ppm, and the amounts of oxygen, S, and P satisfying the formula

$$1350 > 25 \times \text{Oxygen} + 20 \times S + P \text{ (ppm)}.$$

5,160,390

RAPIDLY SOLIDIFIED FE-CR-AL ALLOY FOIL HAVING EXCELLENT ANTI-OXIDATION PROPERTIES

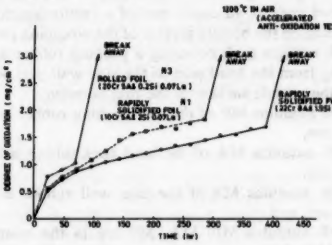
Masao Yukumoto; Michiharu Ozawa; Kazuhide Ishii, and Hiroshi Shimizu, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Japan

Filed Sep. 10, 1991, Ser. No. 757,313

Claims priority, application Japan, Sep. 12, 1990, 2-240035

Int. Cl.[5] C22C *38/06*

U.S. Cl. 148—325 **4 Claims**



1. A rapidly solidified Fe—Cr—Al alloy foil having excellent anti-oxidation properties, said foil essentially consisting of Cr: about 5 to 30 % by weight, Al: about 2 to 15% by weight, Si: about 1.5 to 3% by weight, and REM (Y, Ce, La, Pr, Nd): about 0.07 to 2.0% by weight, the balance being Fe and impurities, said foil having a grain size of not more than about 10 μm.

5,160,391

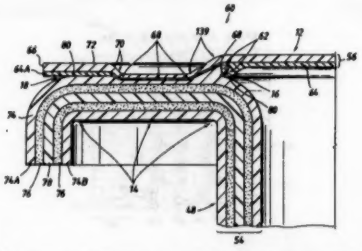
METHOD FOR THE FORMATION OF A CLAMPED WAVE SEAL STRUCTURE

John S. Thomas, Jr., Williamsburg, Va., assignor to James River II, Inc., Milford, Ohio

Filed Apr. 15, 1991, Ser. No. 685,242

Int. Cl.[5] B65B *7/28*

U.S. Cl. 156—69 **9 Claims**



1. A method of forming a peelable seal between a lid and a container flange, said lid having a first material, said flange having a second material facing said lid, said container having an inside rim defined about the interior junction of said lid to said container and having an outside rim defined about the exterior junction of said lid to said container, said method comprising the steps of:

clamping said lid to said container flange by moving a clamp head downward into contact with a second portion of said lid defined above said container flange,

melting or softening a portion of said first material and a portion of said second material by driving a heated seal head downward into contact with a first portion of said lid defined above said container flange,

maintaining pressure on said melted or softened first material and second material with said seal head so as to form interlocking waves of said first material and said second material about the container inside rim, and

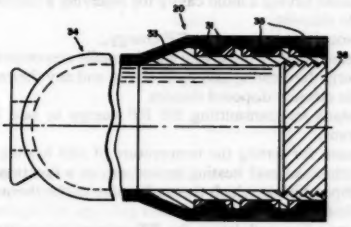
maintaining pressure on said first material and said second material with said clamp head to prevent portions of said melted or softened first material and second material from flowing to or toward said outside rim.

5,160,392

METHOD FOR JOINING TUBULAR FILAMENT WOUND COMPOSITES TO OTHER BODIES

Lawrence C. Thongs, Jr., Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 6, 1991, Ser. No. 741,002
Int. Cl.[5] B65H *81/00*
U.S. Cl. 156—172 5 Claims



1. A method for forming an integrally wound joint structure with a composite structure positioned at an adjacent end of said joint and means provided on an other end of said joint for joining to another structure to form an assembly with adequate structural strength in tension, internal pressurization, bending, compression, and shear as required for pressure vessels, said method comprising:

(i) providing a tube or solid structure of sufficient tensile and shear strength for forming an integrally wound joint structure for joining to another structure;

(ii) cutting or forming one or more circumferential grooves on an outer surface of said tube or solid structure, said one or more circumferential grooves provided with durable resin impregnated filament wound wedge shaped regions at a bottom of said circumferential grooves by hoop winding thereby providing a transition region which enables filament winding layers to smoothly span a distance from the bottom of said circumferential grooves to the top of circumferential rings;

(iii) providing means for attachment to another structure at one end of said tube or solid structure;

(iv) preparing said tube or solid structure having said one or more of circumferential grooves and said means for attachment to receive filament winding by placing on or abutting to a mandrel of a filament winding structure;

(v) winding curable resin impregnated filaments on said tube or solid structure by first winding helix winding layers under low tension followed by hoop winding layers under high tension to cause said helix winding layers to be pulled down individually into said circumferential grooves;

(vi) completing said filament winding by continuing alternate helix and hoop winding layers to form an integrally wound joint structure assembly having hoop strength which exceed burst pressure of the structure to which said joint structure is joined after curing;

(vii) placing said integrally wound joint structure assembly in an oven to complete curing as determined by established curing time and temperature for said curable resin; and,

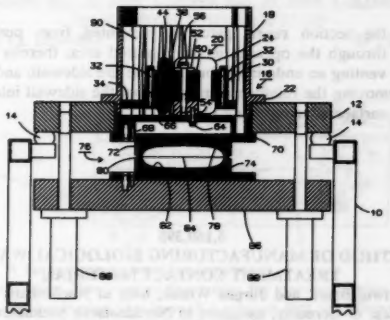
(viii) removing said integrally wound joint structure assembly from said oven after complete curing, said integrally wound joint structure after complete curing being ready for attachment to another structure employing said means provided at one end of said tube or solid structure.

5,160,393

FRICTION WELDER HAVING AN ELECTROMAGNETIC DRIVE WHICH PRODUCES ORBITAL MOTION

Edward A. Snyder, Brockport, N.Y., assignor to Hydroacoustics, Inc., Rochester, N.Y.

Filed Dec. 27, 1990, Ser. No. 634,666
Int. Cl.[5] B29C *65/06*
U.S. Cl. 156—73.5 28 Claims



1. Apparatus for friction welding of parts at an interface therebetween which comprises means for driving one of said parts with orbital motion in an orbital plane with respect to another of said parts while said parts are held in contact at said interface, said means for driving including electromagnetic generating means for producing orbital force in said orbital plane, said electromagnetic force generating means comprising a single body of magnetic material providing an armature having a central axis perpendicular to said orbital plane and a plurality of poles distributed circumferentially by 360°/N, where N is the number of said poles about said axis, N being equal to or greater than 3, and a stator being disposed around said armature, said stator having a plurality of poles each opposed to a different one of said armature poles; means for holding said another of said parts; and means for mounting said one of said parts to execute orbital motion in response to orbital force generated by orbital motion of said armature and wherein said mounting means is attached to said armature.

5,160,394

METHOD FOR TIRE SIDEWALL REPAIR

John C. Olson, 3315 S. Vandecar Rd., Mt. Pleasant, Mich. 48858

Filed Jan. 7, 1991, Ser. No. 638,091
Int. Cl.[5] B29C *73/00*
U.S. Cl. 156—97 6 Claims

1. A process for repairing a ruptured area in a tire having a sidewall with an interior surface, the repair process comprising the steps of:

preparing the area to be patched by cutting an opening in the tire sidewall surrounding the ruptured area such that the opening has essentially uniform surface edges;

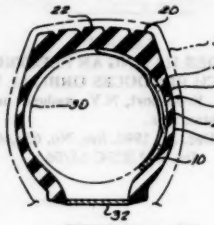
placing a plug of uncured rubber within the prepared area;

laying a section repair patch against the interior surface of the sidewall such that the patch covers the plug;

positioning a reinforcement pad against the interior surface of the sidewall such that the pad covers the section repair patch;

inflating a tube placed within the tire;

placing the tire with a curing chamber and curing the rubber plug within the patch area, the reinforcement pad being capable of withstanding a pressure differential which exists between the tire and the curing chamber, such that



the section repair patch is prevented from pushing through the opening in the ruptured area, thereby preventing an undesirable bulge in the tire sidewall; and

removing the reinforcement pad from the sidewall interior surface after repairing the tire.

5,160,395

METHOD OF MANUFACTURING BIOLOGICAL WATER TREATMENT CONTACT MATERIAL

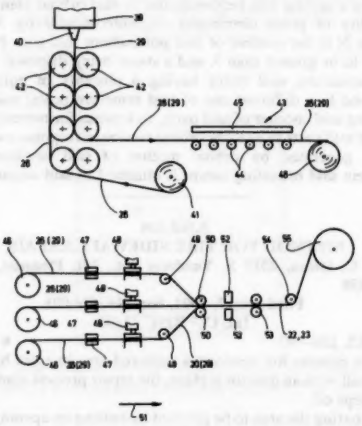
Hartwig Basse, and Jürgen Wittek, both of Nordenham, Fed. Rep. of Germany, assignors to Norddeutsche Seekabelwerk, Fed. Rep. of Germany

Division of Ser. No. 318,653, Mar. 3, 1989, Pat. No. 5,104,716. This application May 24, 1991, Ser. No. 705,125

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1988, 3807695

Int. Cl.[5] C02F *3/04*

U.S. Cl. 156—269 **5 Claims**



1. A process for manufacturing a biological water treatment contact material of a plurality of strips of a plastic material, comprising:

providing a plurality of strands at an elevated temperature;

continuously applying the strands to a web of material; and

continuously severing the web of material between adjacent strands for forming side by side strips.

5,160,396

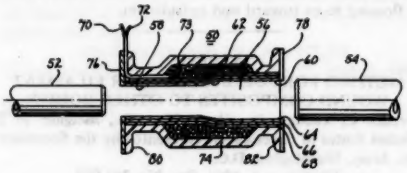
LOW THERMAL INERTIA HEATER

Joseph C. Jensen, Tucson, and Junius E. Taylor, Phoenix, both of Ariz., assignors to Engineering & Research Associates, Inc., Tucson, Ariz.

Filed Feb. 11, 1991, Ser. No. 653,892

Int. Cl.[5] B29C *65/02*

U.S. Cl. 156—304.2 **50 Claims**



1. Apparatus for melting, shaping, forming and welding thermoformable elements with RF energy, said apparatus comprising in combination:

a) a mold having a mold cavity for receiving a thermoformable element;

b) a source for generating RF energy,;

c) means ohmicly resistively and thermally responsive to RF energy for heating said mold cavity and any thermoformable element disposed therein;

d) means for transmitting the RF energy to said heating means;

e) means for setting the temperature of said heating means extrinsic of said heating means and as a function of the temperature at which thermoforming of the thermoformable element will occur; and

f) means for modulating the RF energy transmitted as a function of the temperature of said heating means commensurate with the setting of said temperature setting means to maintain the thermoformable element at its thermoforming temperature.

5,160,397

PLASMA PROCESS APPARATUS AND PLASMA PROCESSING METHOD

Masahiko Doki, Sagamihara, and Kiyoshi Ooiwa, Yokosuka, both of Japan, assignors to Fujitsu Limited and Fuji Electric Co., Ltd., Japan

Filed Apr. 27, 1990, Ser. No. 516,077

Claims priority, application Japan, Apr. 27, 1989, 1-108553; Jul. 3, 1989, 1-171662; Mar. 1, 1990, 2-49810

Int. Cl.[5] H01L *21/00*

U.S. Cl. 156—345 **12 Claims**

1. A plasma processing apparatus comprising:

a cylindrical plasma generating chamber having openings at the opposite ends thereof;

a cylindrical processing chamber communicating with said plasma generating chamber via the opening at one end of said plasma chamber;

means for evacuating said plasma generating chamber and said processing chamber;

a microwave generator for generating pulses of microwaves;

a waveguide means for transferring said pulses of microwaves through an opening at the end of said plasma chamber;

a means for supplying a gas into said plasma generating chamber;

an excitation solenoid surrounding said plasma generating chamber for generating a magnetic field within said plasma chamber for transforming said gas, by resonance effects with said microwaves, into a plasma of active atoms, molecules or ions;

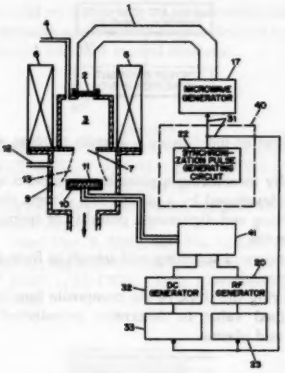
support means positioned within said processing chamber

for supporting a substrate to be processed in a position to be bombarded by active atoms, molecules or ions flowing out of said plasma chamber along lines of magnetic force;

controllable means for generating an RF bias voltage to be applied to said substrate;

controllable for generating a DC bias voltage to be applied to said substrate;

synchronizing means for generating synchronizing signals for keying said RF bias voltage and said DC bias voltage during periods when said microwave pulses are generated; and



mixing means, coupled to said means for generating an RF bias voltage and said means for generating a DC bias voltage, for applying the RF bias voltage and the DC bias voltage to the substrate;

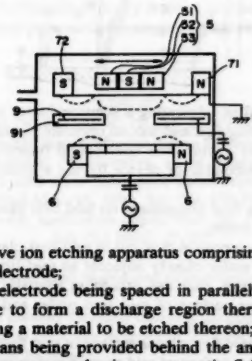
said RF bias voltage and the DC bias voltage being independently controllable for allowing variance of processing conditions, and being applied to the substrate only when the microwaves have been introduced into the plasma generating chamber and plasma is being generated, thereby preventing damage to the substrate surface.

5,160,398

ETCHING METHOD AND APPARATUS

Toshiharu Yanagida, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 16, 1990, Ser. No. 614,137
Claims priority, application Japan, Nov. 17, 1989, 1-298914
Int. Cl.[5] H01L *21/00*
U.S. Cl. 156—345 **13 Claims**



1. A reactive ion etching apparatus comprising:

an anode electrode;

a cathode electrode being spaced in parallel to the anode electrode to form a discharge region therebetween and supporting a material to be etched thereon;

magnet means being provided behind the anode electrode said magnet means having a magnetic field component intersecting with an electric field and said magnet means being movable along a direction intersecting with the electric field; and

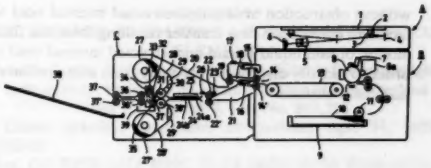
magnetic field applicator means being provided around the cathode electrode and having a magnetic field component intersecting with the electric field, said magnetic field applicator means consisting of a plurality of magnets capable of generating a uniform magnetic field toward the material to be etched.

5,160,399

LAMINATING APPARATUS

Noriyoshi Ueda, and Kimiaki Hayakawa, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 20, 1990, Ser. No. 585,181
Claims priority, application Japan, Sep. 25, 1989, 1-246405; Sep. 25, 1989, 1-246406; Sep. 25, 1989, 1-246407; Sep. 25, 1989, 1-246408; Sep. 25, 1989, 1-246409; Sep. 27, 1989, 1-253390
Int. Cl.[5] B32B *31/00*; F26B *13/10*
U.S. Cl. 156—359 **19 Claims**



1. A laminating apparatus, comprising:

laminating film transporting means for transporting at least one laminating film in such a manner that the laminating film is superposed with at least one surface of the sheet to be laminated;

pressing means for pressing the sheet and the laminating film in a mutually superposed state;

drying means for drying the sheet before it is superposed with the laminating film;

humidity detecting means for detecting moisture content in the sheet; and

control means for controlling said drying means based on detection by said humidity detecting means.

5,160,400

CORRUGATING APPARATUS HAVING A LIQUID FILLED SEAL ROLL

Charles E. Thomas, Baltimore, Md., assignor to United Container Machinery Group, Inc., Glen Arm, Md.

Filed May 24, 1990, Ser. No. 528,298
Int. Cl.[5] B31F *1/28*; B32B *31/12*
U.S. Cl. 156—382 **3 Claims**

1. An apparatus for the manufacture of single faced corrugated board, the apparatus comprising:

a first feed means for feeding medium;

first and second meshing corrugating rolls for accepting therebetween, the medium, to form sinuous flutes on the medium perpendicular to a travel direction of the medium;

a heated driven roll in tangential abutment with said second corrugating roll;

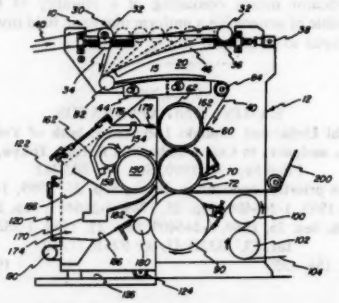
means to apply adhesive to said medium; and

a second feed means for delivering a liner paper between said second fluted roll and said heated driven roll, pinching said liner paper and medium together to form a bonded single faced corrugated sheet;

an enclosed pressurized chamber covering said second meshing corrugating roll, the pressure thereby retaining the formed flutes within the respective corrugations on said second corrugating roll; and

a seal roll having an outer surface with a portion thereof in tangential rolling abutment with said heated driven roll

thereby pressure sealing said chamber, said seal roll having a cylindrical cross-section and also having a hollow center forming an unobstructed internal void, said seal roll being at least partially liquid filled, said liquid moving



without obstruction in said unobstructed internal void to facilitate convection heat transfer resulting from the fluid motion of said liquid in said unobstructed internal void in order to radially distribute heat away from said portion of said outer surface.

5,160,401

METHOD OF GROWING MIXED CRYSTALS FROM MELTS OF OXIDIC MULTICOMPONENT SYSTEMS

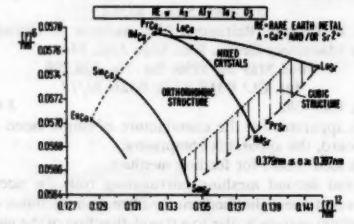
Dieter Mateika, Ellerbek, and Erich Völkel, Lüdinghausen, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 1, 1991, Ser. No. 650,397

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1990, 4003184

Int. Cl.[5] C30B *15/00*

U.S. Cl. 156—600 **20 Claims**



1. A method of growing mixed crystals having at least two lattice sites, each of which sites has a different number of adjoining oxygen atoms characterized in that said homogenous mixed crystals are grown by forming melts in which the cations which are to populate a lattice site having the largest number of adjoining oxygen ions and cations which are to populate a second lattice site having the second largest number of adjoining oxygen atoms are selected in such a manner that the ratio between the average ion radii of the cations on the first lattice site and the average ion radii of the cations on the second lattice site ranges from 2.2 to 2.5 and pulling said crystals on nucleating means from said melts.

5,160,402

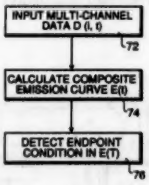
MULTI-CHANNEL PLASMA DISCHARGE ENDPOINT DETECTION METHOD

David Cheng, San Jose, Calif., assignor to Applied Materials, Inc., Santa Clara, Calif.

Filed May 24, 1990, Ser. No. 528,297

Int. Cl.[5] H01L *21/00*

U.S. Cl. 156—627 **12 Claims**



1. A method of monitoring a plasma process which comprises

(a) optically monitoring a plurality of preselected emission spectra developed by a plasma in a plasma chamber,

(b) amplifying and digitizing a plurality of spectra signals of said spectra,

(c) weighting and summing said signals to form a composite function, and

(d) comparing the slope of the composite function to a predetermined value to determine preselected conditions within said plasma.

5,160,403

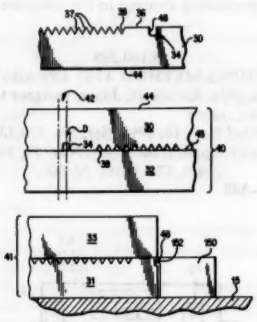
PRECISION DICED ALIGNING SURFACES FOR DEVICES SUCH AS INK JET PRINTHEADS

Almon P. Fisher, and Donald J. Drake, both of Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 9, 1991, Ser. No. 742,802

Int. Cl.[5] H01L *21/306, 21/00;* B32B *31/00;* B44C *1/22*

U.S. Cl. 156—633 **20 Claims**



1. A method of fabricating a semiconductor device from a first wafer having first and second opposite planar surfaces and a second wafer having first and second opposite planar surfaces, said semiconductor device having a buttable side edge, comprising:

a) forming a first component on said first planar surface of said first wafer;

b) placing a precision dice cut in said first planar surface of said first wafer closely adjacent to said first component, said precision dice cut extending partially through said first planar surface of said first wafer and defining said buttable side edge;

c) bonding said first planar surface of said first wafer to said first planar surface of said second wafer, said first planar

surface of said second wafer containing a second component and being aligned with and bonded to said first wafer so that said first and second components cooperate to form said semiconductor device; and

d) removing portions of said first and second wafers surrounding said first and second components, respectively, to define said semiconductor device, said removing including placing a second dice cut entirely through said first and second wafers parallel to and slightly offset from said precision dice cut, said second dice cut being located slightly further away from said first component than said precision dice cut and intersecting a portion of said precision dice cut so that a side of said semiconductor device which includes said buttable edge is defined by said precision dice cut and said second dice cut.

5,160,404

METHOD OF REMOVING A PATTERNED MULTILEVEL RESIST FROM A SURFACE LAYER ON A SUBSTRATE

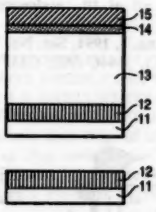
Takushi Motoyama, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 5, 1990, Ser. No. 622,597

Claims priority, application Japan, Dec. 5, 1989, 1-315712

Int. Cl.[5] B44C *1/22*; C03C *15/00, 25/06*; B29C *37/00*

U.S. Cl. 156—643 **15 Claims**



1. A method for removing a patterned multilevel resist formed on a substrate layer of a substrate, the multilevel resist having a lower resist layer and an upper resist layer formed on the lower resist layer, the upper resist layer containing silicon atoms, comprising the steps of:

forming a resin layer on the lower resist layer and on a surface exposed from the patterned multilevel resist;

etching said resin layer and the patterned multilevel resist by a first dry etching process using halogen containing gas until the upper resist layer is removed; and

etching the resin layer and the multilevel resist, which have remained after said first dry etching process, by a second dry etching process using oxygen containing gas.

5,160,405

METHOD OF ETCHING DIAMOND THIN FILMS

Shigeaki Miyauchi; Koichi Miyata; Kazuo Kumagai, all of Kobe, and Koji Kobashi, Nishinomiya, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Mar. 18, 1991, Ser. No. 670,590

Claims priority, application Japan, Mar. 19, 1990, 2-71672

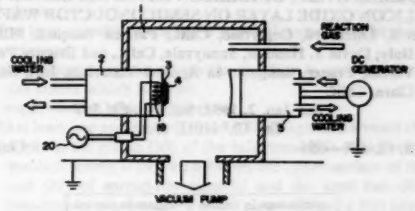
Int. Cl.[5] H01L *21/00*

U.S. Cl. 156—643 **12 Claims**

1. An etching method of diamond films which comprises the steps of:

providing a masked diamond film in an atmosphere of a gas containing at least one member of the group consisting of oxygen and hydrogen;

subjecting the diamond film to an irradiation by an electron beam generated by a DC discharge through a pattern of the mask; and



contacting the diamond film with a plasma produced by the action of the electron beam in said atmosphere of a gas, whereby unmasked areas of the diamond film are etched.

5,160,406

METHOD FOR PRODUCING A FORMED STRUCTURAL ELEMENT

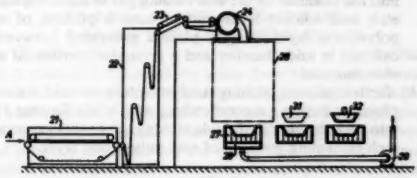
Eusebio Lucca, Vercelli, and Paul H. Gillard, Rocestederighi, both of Italy, assignors to Matec Holding AG, Switzerland

Filed Apr. 16, 1990, Ser. No. 509,228

Claims priority, application Switzerland, Apr. 14, 1989, 1425/89

Int. Cl.[5] B27N *3/12*; B29C *51/10*; B02C *18/00*; B32B *31/16*

U.S. Cl. 156—62.4 **5 Claims**



1. A method for producing a formed structural element of fiber material bonded with synthetic resin comprising the steps:

sprinkling or spraying a fine-grained or flowable thermosetting synthetic resin bonding agent on a nonwoven fabric made of natural fibers, said resin bonding agent having a temperature at which said resin bonding agent is softened;

transporting said nonwoven fabric which is permeated with synthetic resin bonding agent to a location for fragmenting said fabric;

preheating said nonwoven fabric permeated with synthetic resin bonding agent to said temperature at which said thermosetting resin is softened, thereby gluing said fabric with said resin bonding agent prior to fragmenting said fabric;

fragmenting said nonwoven fabric which is permeated with prehardened synthetic bonding agent into fiber bundles, corresponding to flakes, of a size greater than individual fibers;

applying the fragmented fabric onto a perforated female mold of a molding press;

compressing the applied fabric on the female mold by means of an air stream suctioned through the perforations;

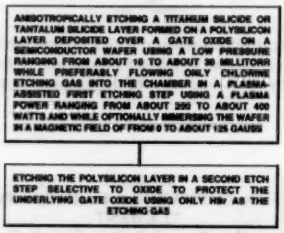
forming structural elements with a stable shape by placing a similarly perforated male mold on top and pressing, in the presence of a hot air stream that is conducted through the perforations in the male mold and the female mold; and hardening the synthetic resin bonding agent.

5,160,407

LOW PRESSURE ANISOTROPIC ETCH PROCESS FOR TANTALUM SILICIDE OR TITANIUM SILICIDE LAYER FORMED OVER POLYSILICON LAYER DEPOSITED ON SILICON OXIDE LAYER ON SEMICONDUCTOR WAFER

Ian S. Latchford, Cupertino, Calif.; Patrica Vasquez, Milan, Italy; David J. Hemker, Sunnyvale, Calif., and Brigitte Petit, Varces, France, assignors to Applied Materials, Inc., Santa Clara, Calif.

Filed Jan. 2, 1991, Ser. No. 636,867
Int. Cl.[5] H01L *21/00*
U.S. Cl. 156—656 9 Claims


ANISOTROPICALLY ETCHING A TITANIUM SILICIDE OR TANTALUM SILICIDE LAYER FORMED ON A POLYSILICON LAYER DEPOSITED OVER A GATE OXIDE ON A SEMICONDUCTOR WAFER USING A LOW PRESSURE RANGING FROM ABOUT 10 TO ABOUT 30 MILLITORR WHILE PREFERABLY FLOWING ONLY CHLORINE ETCHING GAS INTO THE CHAMBER IN A PLASMA-ASSISTED FIRST ETCHING STEP USING A PLASMA POWER RANGING FROM ABOUT 200 TO ABOUT 400 WATTS AND WHILE OPTIONALLY IMMERSING THE WAFER IN A MAGNETIC FIELD OF FROM 0 TO ABOUT 125 GAUSS
ETCHING THE POLYSILICON LAYER IN A SECOND ETCH STEP SELECTIVE TO OXIDE TO PROTECT THE UNDERLYING GATE OXIDE USING ONLY HBr AS THE ETCHING GAS

1. A two step etch process for the anisotropic plasma etching of an integrated circuit structure comprising a masked titanium silicide or tantalum silicide layer and an underlying polysilicon layer formed over a silicon oxide layer on a semiconductor wafer which comprises:

a) anisotropically plasma etching the structure in a vacuum chamber maintained at a low pressure of from about 10 to about 30 milliTorr in a first etching step while flowing Cl_2 into the chamber as the sole etching gas to anisotropically etch said silicide layer and at least a portion of said polysilicon layer using a plasma generated between a cathode in said chamber and a grounded portion of said chamber; and

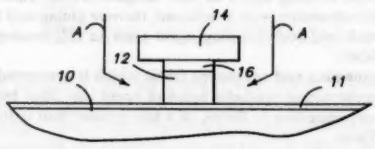
b) further plasma etching said structure in said vacuum chamber during a second etching step while flowing HBr into said chamber as the sole etching gas to anisotropically etch remaining portions of said polysilicon layer.

5,160,408

METHOD OF ISOTROPICALLY DRY ETCHING A POLYSILICON CONTAINING RUNNER WITH PULSED POWER

Paul Long, Meridian, Id., assignor to Micron Technology, Inc., Boise, Id.

Filed Apr. 27, 1990, Ser. No. 516,054
The portion of the term of this patent subsequent to May 5, 2009, has been disclaimed.
Int. Cl.[5] H01L *21/00*
U.S. Cl. 156—656 14 Claims



1. A method of isotropically dry etching a WSi_x/polysilicon sandwich structure atop a silicon substrate wafer containing integrated semiconductor circuits, the sandwich structure having an overlying photoresist masking portion, the method being conducted within a parallel plate reactor which in operation provides intermittent pulses of power over the parallel plates, the method comprising:

injecting gases to within the reactor to provide a reactive gas mixture at a preselected pressure within the reactor, the reactive gas mixture comprising SF_6, Cl_2, and O_2 in approximate respective volume ratios of $10.0\pm5\%:2.0\pm5\%:3.0\pm5\%$;

applying preselected intermittent pulses of a preselected amount of power to the parallel plates to ionize the reactive gas mixture into a plasma state, such intermittent pulses being defined by an RFon period, an RFoff period, and an RFrepeat period; the RFon period being that time period during which the preselected amount of power is applied to the plates, the RFoff period being that time period when a significantly reduced amount of power or no power is applied to the parallel plates, the RFrepeat period being the sum of a single RFon period and a single consecutively following RFoff period;

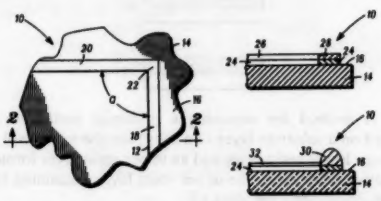
subjecting the wafer to the intermittent pulses and reactive gas mixture at the preselected pressure for a preselected amount of time to isotropically etch the WSi_x and polysilicon beneath the photoresist masking portion at substantially the same rate and provide a WSi_x/polysilicon runner having substantially vertical sides and having resist overhang projecting laterally from the vertical sides of the WSi_x/polysilicon runner.

5,160,409

SOLDER PLATE REFLOW METHOD FOR FORMING A SOLDER BUMP ON A CIRCUIT TRACE INTERSECTION

Kevin D. Moore, Schaumburg; John W. Stafford, St. Charles; William M. Beckenbaugh, Barrington, and Ken Cholewczynski, Streamwood, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 5, 1991, Ser. No. 740,271
Int. Cl.[5] B44C *1/22;* C23F *1/00*
U.S. Cl. 156—656 14 Claims



1. A method for forming a solder-bumped circuit trace on a dielectric substrate, said method comprising

fabricating a circuit trace on the substrate comprising a first linear section and a second linear section disposed to intersect said first section at intersection so as to form an angle between the sections that is between about 45 degrees and 135 degrees, said trace comprising a solder-wettable metal layer adjacent the substrate and an outer plate composed of a solder alloy and having a uniform thickness, and

heating the circuit trace at a temperature effective to melt the solder alloy and to draw the molten solder alloy onto the intersection to form a solder bump.

5,160,410

PRESS CYNLINDER SHELL STRUCTURE FOR PAPER MACHINE PRESS SECTION

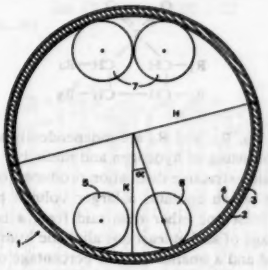
Pekka Tammi, and Kari Marjoniemi, both of Tampere, Finland, assignors to Hollming Oy, Rauma, Finland

Filed Mar. 13, 1991, Ser. No. 668,593
Claims priority, application Finland, Mar. 14, 1990, 901282
Int. Cl.[5] D21F *3/08*
U.S. Cl. 162—358.1 20 Claims

13. A press cylinder in a paper machine press section, said press cylinder comprising:

at least four support rolls each having an external peripheral surface, and

a hollow cylindrical shell structure having an internal peripheral surface, the shell structure enclosing the support rolls and the external peripheral surfaces of the support rolls being in rolling engagement with the internal peripheral surface of the shell structure, the shell structure having a core layer of an elastic material having a high shear elasticity, an outer face layer of a resilient, durable material having a greater stiffness than the material of the core layer, and an inner face layer of a with substantially identical properties to the material of the outer face layer, the core layer being disposed between the inner face layer and the outer face layer.



5,160,411

INSTALLATION FOR PRODUCING PANEL-SHAPED ARTICLES FROM A MIXTURE OF PLASTER AND FIBROUS MATERIAL

Jörg Bold, Kaiserslautern, Fed. Rep. of Germany, assignor to Babcock-Bsh AG, Fed. Rep. of Germany

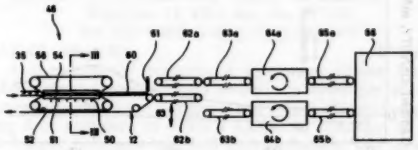
PCT No. PCT/EP89/00002, § 371 Date Sep. 5, 1990, § 102(e) Date Sep. 5, 1990, PCT Pub. No. WO89/06592, PCT Pub. Date Jul. 27, 1989

PCT Filed Jan. 3, 1989, Ser. No. 536,559

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1988, 3801315

Int. Cl.[5] B28B *1/52, 5/02*

U.S. Cl. 162—398 **4 Claims**



1. An apparatus for the production of the sheet-like bodies from a mixture of plaster, water and fibrous material which comprises

(a) device which prepares the raw materials, meters them and mixes them in a dry state in a desired ratio;

(b) a device which blends the dry mix in a controlled way with an exactly dosed quantity of water;

(c) a spreading device, which spreads the mix on a forming line belt, which comprises a continuously running, endless forming belt;

(d) a continuously operating belt press, through which the moist mat of material spread out on the forming line endless belt is guided for compaction to produce a shaped member, which belt press comprises an upper and a lower press platen with a variable and controllable distance between them, and an endless steel belt around each press platen which rotates at the speed of the forming line belt;

(e) a cutting device disposed at the end of the forming line belt which divides the endless shaped body into individual sheets;

(f) at least one setting station in which the plaster in the sheet sets; and

(g) a drying station in which the moisture is removed from the sheets which have set,

the improvement which comprises

(h) at least one endless-belt screen (**58, 59**) guided around the upper press platen (**55**) of the belt press (**46**), which endless-belt screen is located between the upper surface of the mat (**35**) of spread-out material and the steel belt (**56**) associated with the upper press platen (**55**); the belt press being structured and arranged such that sheets are formed with an upper surface containing screen markings and a lower surface which is smooth; and

(i) at least one turing device (**64*a*, 64*b***) located between the cutting device (**61**) and the setting station (**5**) (**66**) which is structured and arranged to rotate the individual sheets through 180° so that the upper surface of the sheets which contains screen markings from said at least one endless-belt screen (**58, 59**) will face downwards and the previously lower, smooth surface of the sheets will face upwards, said apparatus being structured and arranged to eliminate any subsequent treatment of said smooth surface.

5,160,412

DEHYDRATION OF ACETIC ACID BY AZEOTROPIC DISTILLATION

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Filed Mar. 10, 1992, Ser. No. 848,184

Int. Cl.[5] B01D *3/36;* C07C *51/46*

U.S. Cl. 203—16 **1 Claim**

1. A method for recovering water from a mixture of water and acetic acid which comprises distilling a mixture of water and acetic acid in the presence of an azeotropic forming agent, recovering the water and the azeotrope forming agent as overhead product and obtaining the acetic acid from the stillpot, wherein said azeotrope forming agent comprises a material selected from the group consisting of methyl propionate, hexyl acetate, 2-methyl hexanone-5, diisobutyl ketone, hexyl formate, 2-octanone, 4-methyl-2-pentanone, diethyl malonate, 2-undecanone, 2,4-pentanedione, propiophenone, 4-methyl pentyl acetate, ethyl n-valerate, amyl propionate, propyl caproate, ethylene glycol diacetate, triacetin and isophorone.

5,160,413

MICRO-DISTILLATION PROCESS FOR CYANIDE

Joe D. Allison, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Aug. 16, 1990, Ser. No. 568,925

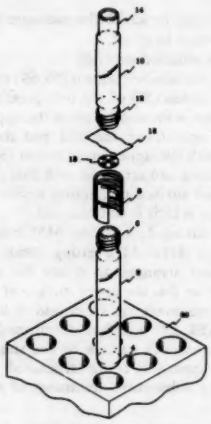
Int. Cl.[5] B01D *3/00;* C01C *3/02*

U.S. Cl. 203—35 **12 Claims**

1. A process for distilling cyanide which comprises:

(a) adding cyanide, water, and an acidifying agent to a micro-distillation apparatus which comprises lower and upper acid-resistant elongated members, said lower acid-resistant member being sealed at one end and open at the other end having a cross sectional area from about 15 mm^2 to about 2000 mm^2 and being of a length equal to or greater than said upper acid-resistant member, wherein said lower acid-resistant member is of sufficient length as to preclude the distillation of water into aid upper acid-resistant member, said upper acid-resistant member being open at both ends and having a cross sectional area from about 15 mm^2 to about 2000 mm^2, said upper and lower acid-resistant members being connectably attached by means of an acid-resistant coupler which contains an

acid-resistant support disc containing holes, said disc positioned between said acid-resistant coupler and said upper member supporting a membrane permeable to acid gas, wherein said upper member contains a slat forming solution;



(b) heating the micro-distillation apparatus to a temperature sufficient to cause the evolution of cyanide gas, which permeates the membrane, and

(c) collecting the cyanide gas in the salt forming solution.

5,160,414

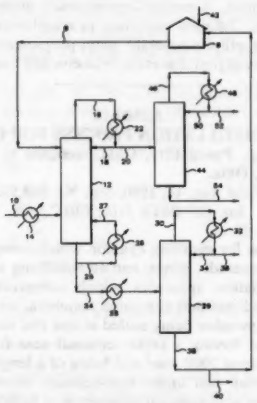
EXTRACTIVE DISTILLATION OF ALCOHOL/ETHER/HYDROCARBON MIXTURES

Fu-Ming Lee; Robert L. Hair, and Ronald E. Brown, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

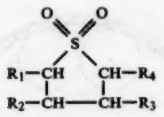
Filed Jul. 19, 1991, Ser. No. 732,981

Int. Cl.[5] B01D *3/40*; C07C *41/42*

U.S. Cl. 203—57 **49 Claims**



1. A process for recovering ethers from mixtures of ethers, aliphatic hydrocarbons and alcohols comprising extractive distillation of a feed consisting essentially of (a) at least one ether containing 4–8 carbon atoms per molecule, (b) at least one aliphatic hydrocarbon selected from the group consisting of alkanes and alkenes, said alkanes containing 3–7 carbon atoms per molecule and said alkenes containing 3–7 carbon atoms per molecule and (c) at least one saturated aliphatic alcohol containing 1–5 carbon atoms and one OH group per molecule, said extractive distillation employing a solvent consisting essentially of at least one sulfolane compound containing 4–8 carbon atoms per molecule and having the general formula of



wherein R_1, R_2, R_3, and R_4 are independently selected from the group consisting of hydrogen and methyl;

wherein said extractive distillation produces (i) an overhead product which contains a larger volume percentage of said at least one ether than said feed, a larger volume percentage of said at least one aliphatic hydrocarbon than said feed and a smaller volume percentage of said at least one saturated aliphatic alcohol than said feed, and (ii) a bottoms product which contains said solvent, a smaller percentage of said at least one ether than said feed, a smaller percentage of said at least one aliphatic hydrocarbon than said feed and a larger percentage of said at least one saturated aliphatic alcohol than said feed; and

wherein said at least one ether is separated and recovered from said overhead product, and said solvent is separated and recovered from said bottoms product.

5,160,415

CARBON ELECTRODE, AND METHOD AND APPARATUS FOR THE ELECTROLYSIS OF A HYDROGEN FLUORIDE-CONTAINING MOLTEN SALT WITH THE CARBON ELECTRODE

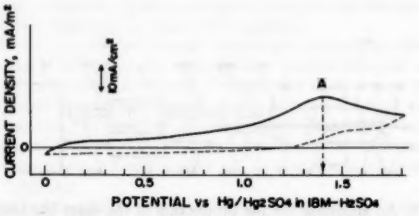
Teruhisa Kondo, Toyonaka; Tetsuro Tojo, Kyoto, and Nobuatsu Watanabe, Nagaokakyo, all of Japan, assignors to Toyo Tanso Co., Ltd., Osaka, Japan

Filed Feb. 5, 1991, Ser. No. 650,536

Claims priority, application Japan, Feb. 6, 1990, 2-25274

Int. Cl.[5] C25B *1/24, 9/00, 11/12*

U.S. Cl. 204—60 **5 Claims**



4. A method for the electrolysis of a hydrogen fluoride-containing molten salt, comprising electrolyzing an electrolytic bath containing a hydrogen fluoride-containing molten salt using a carbon electrode as an anode, said carbon electrode comprising a porous carbon block and having a flexural strength of at least 50 MPa and exhibiting, on a linear sweep voltammogram obtained by subjecting the carbon electrode to potential sweep in concentrated sulfuric acid at a sweep rate of 5 mV/sec. at 25° C., a peak having a maximum current density at a potential of at least 1.2 V relative to the potential of mercuric sulfate as a standard electrode, and said hydrogen fluoride-containing molten salt being of a KF-HF system, a CsF-HF system, an NOF-HF system, a KF-NH_4F-HF system or an NH_4F-HF system.

5,160,416

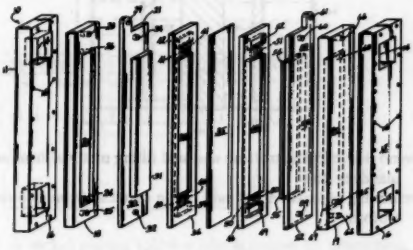
PROCESS FOR THE PRODUCTION OF PERCHLORIC ACID

David W. Cawlfield; Ronald L. Dotson, both of Cleveland; Budd L. Duncan, Athens; Sudhir K. Mendiratta, and Kenneth E. Woodard, Jr., both of Cleveland, all of Tenn., assignors to Olin Corporation, Cheshire, Conn.

Continuation-in-part of Ser. No. 502,099, Mar. 30, 1990, Pat. No. 5,064,514. This application Mar. 22, 1991, Ser. No. 674,825

Int. Cl.[5] C25B *1/28, 1/22*

U.S. Cl. 204—82 19 Claims



1. A method of operating a filter press membrane cell having an anloyte compartment and a catholyte compartment separated by a cation selectively permeable membrane comprising the steps of:

(a) continuously circulating and recirculating an anolyte solution containing aqueous hypochlorous acid substantially free of ionic impurities including chloride ions and alkali metal ions into and through the anolyte compartment;

(b) filling the catholyte compartment with a catholyte liquid; and

(c) electrolyzing the anolyte solution to oxidize hypochlorous acid and cause H_3O^+ to migrate through the membrane producing an acidic catholyte and to produce chloric acid in the anolyte, the chloric acid further being electrochemically oxidized to form perchloric acid in the anolyte product where no oxygen is generated.

5,160,417

ELECTROLYTIC PROCESS FOR TREATMENT OF PHOTOGRAPHIC WASTEWATER EFFLUENT

Michael E. Neale, Welland, Canada, assignor to Environmental Systems (International) Ltd., Nassau, The Bahamas

Filed Sep. 11, 1991, Ser. No. 757,631

Int. Cl.[5] C25B *1/00, 3/00;* C25C *1/00*

U.S. Cl. 204—130 18 Claims

1. A process for treatment of wastewater effluent from a photographic process which produces a developer effluent comprising developer pollutants and a fixer effluent comprising fixer pollutants to effect a substantial reduction in said developer pollutants and said fixer pollutants, said process comprising the steps of:

feeding said developer effluent to a developer treatment zone; first adjustment of the pH of said developer effluent to greater than about 7; feeding said developer effluent to an electrolytic cell comprising a first electrode and a second electrode in a spaced relationship with respect to one another; electrolyzing said developer effluent in the electrolytic cell in the presence of an electrolyte to precipitate said developer pollutants (i) substantially avoiding deposition thereof on either of said first electrode and said second electrode, and (ii) effecting a substantial reduction thereof in said developer effluent; and second adjustment of the pH of said developer effluent in the range of from about 6.0 to about 10.5; and

feeding said fixer effluent to a fixer treatment zone; feeding said fixer effluent to an electrolytic cell comprising a first electrode and a second electrode in a spaced relationship with respect to one another; electrolyzing said fixer effluent in said electrolytic cell in the presence of an electrolyte to precipitate said fixer pollutants (i) substantially avoiding deposition thereof on either of said first electrode and said second electrode, and (ii) effecting a substantial reduction thereof in said fixer effluent; and, thereafter, adjustment of the pH of said fixer effluent in the range of from about 6.0 to about 10.5.

5,160,418

ENZYME ELECTRODES AND IMPROVEMENTS IN THE MANUFACTURE THEREOF

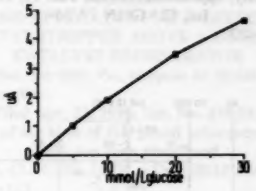
William H. Mullen, Ely, Great Britain, assignor to Cambridge Life Sciences plc, Ely, England

Filed Jul. 18, 1989, Ser. No. 381,580

Claims priority, application United Kingdom, Jul. 28, 1988, 8817997

Int. Cl.[5] G01N *27/26;* C25F *7/00*

U.S. Cl. 204—153.12 45 Claims



1. A method for the manufacture of enzyme electrodes comprising a substantially homogeneous mixture of a finely divided platinum group metal or oxide and one or more enzymes deposited as an electrically conductive layer upon the surface of an underlying support, the electrode being amperometrically responsive to the activity of the enzyme when the enzyme containing a layer of the electrode is in contact with the respective enzyme substrate, the method comprising forming a substantially uniform suspension comprising the finely divided platinum group metal or oxide and said enzyme(s) suspended in a liquid suspension medium, depositing that suspension on the surface of the support member, and drying the deposited suspension at a temperature below the deactivation temperature of the enzyme thereby to deposit the finely divided platinum group metal or oxide and said enzyme(s) as a substantially uniform, homogeneous coating layer on the surface of the support.

5,160,419

ELECTRODE FOR A COULOMETRIC TYPE OF ELECTROCHEMICAL DETECTOR

Yoshiteru Kageyama; Yoshiaki Sawada, and Akira Yoshida, all of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Filed Jul. 29, 1991, Ser. No. 737,064

Claims priority, application Japan, Aug. 1, 1990, 2-204757

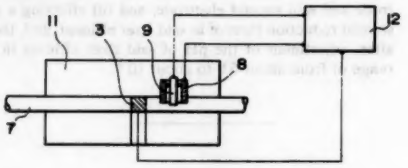
Int. Cl.[5] G01N *27/26*

U.S. Cl. 204—294 10 Claims

1. An electrode for a coulometric type of electrochemical detector, comprising a porous carbon product having the following physical properties (1) to (3):

(1) an average pore size in the range of 5 to 70 μm,

(2) a specific surface area in the range of 0.1 to 3 m^2/g, as determined by the BET method, and



(3) a stack thickness of crystallite (Lc(002)) of 40 Å or less, as determined by X-ray diffractometry.

5,160,420

ANALYZING APPARATUS

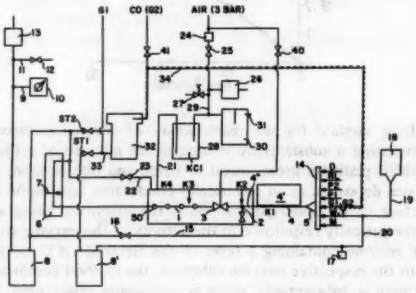
Hermann Marsoner, Steinberg, and Horst Rüther, Graz, both of Austria, assignors to AVL Medical Instruments AG, Schaffhausen, Switzerland

Division of Ser. No. 206,291, Jun. 14, 1988. This application Apr. 29, 1991, Ser. No. 692,695

Claims priority, application Austria, Jun. 17, 1987, 1552/87

Int. Cl.[5] G01N *27/26*

U.S. Cl. 204—433 **1 Claim**



1. An analyzing apparatus which comprises a pH measuring device with a reference electrode, a measuring channel, a waste tank and a electrolyte tank including a means for locating said electrolyte tank below said reference electrode, said reference electrode defining a closed chamber and including a fine-pored diaphragm in communication with said measuring channel, a capillary channel which extends from said chamber to said fine-pored diaphragm, a first connection means for connection with said waste tank and a second connection means for connection with said electrolyte tank, said electrolyte tank generating a reduced hydrostatic pressure inside the reference electrode.

5,160,421

ELECTROFORMS WITH HIGH DIMENSIONAL STABILITY

Andrew R. Melnyk, Rochester; William G. Herbert, Williamson, both of N.Y., and Henry Grey, Las Vegas, Nev., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 2, 1991, Ser. No. 801,206

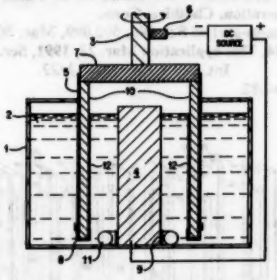
Int. Cl.[5] C25D *1/00*

U.S. Cl. 205—67 **18 Claims**

1. A process of preparing an electroform, comprising the steps of:

electroforming a layer of metal on an inner surface of a hollow mandrel, said mandrel being submerged in an electroforming bath, thereby forming an electroform having a hollow interior;

filling said hollow interior with a filling material before removing said electroform from said mandrel;



removing said electroform and said filling material from said mandrel; and

removing at least part of said filling material from said electroform.

5,160,422

BATH FOR IMMERSION PLATING TIN-LEAD ALLOYS

Shigefumi Nishimura, Yawata; Masao Fukuda, Takatsuki, and Yoshiji Shimizu, Higashiosaka, all of Japan, assignors to Shimizu Co., Ltd., Osaka, Japan

Filed May 29, 1990, Ser. No. 530,169

Claims priority, application Japan, May 29, 1989, 1-136957; Jun. 2, 1989, 1-141874

Int. Cl.[5] C25D *3/32, 3/36*

U.S. Cl. 205—254 **3 Claims**

1. A plating bath for immersion plating a substance with a tin-lead alloy, and bath comprising:

a. tin(II) ions,

b. lead(II) ions,

c. organic sulfo groups,

d. thiourea,

e. a thiourea derivative selected from the group consisting of dimethylol thiourea,
1-acetyl-2-thiourea,
monomethyl thiourea,
dimethyl thiourea,
trimethyl thiourea,
monethyl thiourea and
1,3-diethyl thiourea,

f. aluminum chloride and

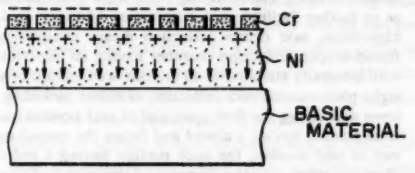
g. a surfactant.

5,160,423

NICKEL PLATING SOLUTION, NICKEL-CHROMIUM ELECTROPLATING METHOD AND NICKEL-CHROMIUM PLATING FILM

Hiroshi Yokoi, Odawara, Japan, assignor to Kanto Kasei Co., Ltd., Yokosuka, Japan

Filed Oct. 30, 1990, Ser. No. 606,024
Claims priority, application Japan, Nov. 9, 1989, 1-292086
The portion of the term of this patent subsequent to Oct. 2, 2007, has been disclaimed.
Int. Cl.[5] C25D *3/12, 3/56*
U.S. Cl. 205—255 5 Claims



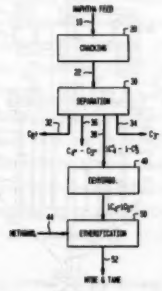
1. A nickel plating solution characterized by containing, in solution, nickel or a nickel salt and, in solution, 0.5 to 20 g/l of salt of an element in Group IIa of the periodic table.

5,160,424

HYDROCARBON CRACKING, DEHYDROGENATION AND ETHERIFICATION PROCESS

Q. N. Le, Cherry Hill; H. Owen, Belle Mead, both of N.J., and P. H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 442,806, Nov. 29, 1989, Pat. No. 4,969,987. This application Nov. 13, 1990, Ser. No. 612,932
Int. Cl.[5] C10G *57/00;* C07C *4/06*
U.S. Cl. 208—67 17 Claims



1. A process for upgrading paraffinic naphtha to high octane fuel comprising;

contacting a fresh naphtha feedstock stream containing a major amount of C7+ alkanes and naphthenes with medium pore acid cracking catalyst under low pressure selective cracking conditions effective to produce a cracking effluent containing C4–C5 isoalkenes and C4–C5 isoalkanes, said cracking catalyst being substantially free of hydrogenation-dehydrogenation metal components and having an acid cracking activity less than 15;

separating said cracking effluent to obtain an olefinic fraction rich in C4–C5 isoalkenes and a paraffinic fraction rich in C4–C5 isoalkanes and a C6+ liquid fraction of enhanced octane value;

dehydrogenating the C4–C5 isoalkanes to produce additional C4–C5 isoalkenes; and

etherifying the C4–C5 isoalkene fraction and said dehydrogenated additional C4–C5 isoalkenes by catalytic reaction with lower alkanol to produce tertiary-alkyl ether product.

5,160,425

METHOD OF INHIBITING FORMATION OF FOULING MATERIALS DURING BASIC WASHING OF HYDROCARBONS CONTAMINATED WITH OXYGEN COMPOUNDS

Vincent E. Lewis, Missouri City, Tex., assignor to Nalco Chemical Company, Naperville, Ill.

Filed Jun. 21, 1991, Ser. No. 718,623
Int. Cl.[5] C10G *57/00, 9/16;* C09K *15/22*
U.S. Cl. 208—95 17 Claims

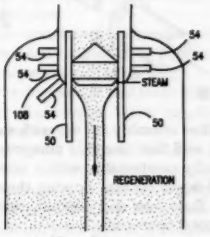
11. A method of inhibiting the formation and deposition of fouling materials on the structural parts of a wash system during basic washing with a solution having a pH >7 of a pyrolytically produced olefin compound or compounds contaminated with at least one carbonyl compounds, said method comprising adding to said basic wash a sufficient amount for inhibiting formation of polymeric fouling materials of carbohydrazide.

5,160,426

PROCESS AND APPARATUS FOR INDIRECT HEATING OF CATALYST STRIPPER ABOVE A BUBBLING BED CATALYST REGENERATOR

Amos A. Avidan, Yardley, Pa., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Apr. 27, 1990, Ser. No. 515,931
The portion of the term of this patent subsequent to Jul. 16, 2008, has been disclaimed.
Int. Cl.[5] C10G *11/00, 35/10;* B01J *20/34*
U.S. Cl. 208—113 6 Claims



1. A fluidized catalytic cracing process wherein a heavy hydrocarbon feed comprising hydrocarbons having a boiling point above about 650 F is catalytically cracked to lighter products comprising the steps of:

catalytically cracking said feed in a catalytic cracking zone operating at catalytic cracking conditions by mixing, in the hot regenerated catalytic cracking catalyst withdrawn from a catalyst regenerator, and cracking said feed in said riser reactor to produce catalytically cracked products and spent catalyst which are discharged from the top of the riser into a catalyst disengaging zone wherein cracked products are separated from spent catalyst;

separating cracked prodcuts from spent catalyst in said catalyst disengaging zone to produce a cracked product vapor phase which is recovered as a product and a spent catalyst phase which is discharged from said disengaging zone into a heated catalyst stripper in a stripper vessel contiguous with and beneath said disengaging zone and above a bubbling dense bed catalyst regenerator;

heating catalyst in said stripper, by indirect heat exchange with hot regenerated catalyst in said bubbling dense bed regenerator using a heat exchange means selected from

the group of heat pipes, tube bundles and surface mounted modifications to the walls of said stripper vessel to increase heat transfer, and steam stripping said spent catalyst with stripping steam in said stripping vessel to prodcut a stripper vapor comprising cracked products and stripping steam which is removed from said stripped zone as a product and a hot stripped catalyst phase which is discharged into a vertical stripper standpipe beneath said stripping zone;

discharging said hot stripped catalyst from said stripper standpipe into the bubbling dense phase fulidized bed catalyst regeneration zone contiguous with and beneath said stripping zone;

regenerating said hot stripped catalyst in said regeneration zone at catalyst regeneration conditions, by contact with an oxygen containing regeneration gas to produce hot regenerated catalyst having a temperature above said hot stripped catalyst temeprature and indirectly heating said hot stripping vessel; and

recycling hot regenerated catalyst to said riser reactor.

5,160,427

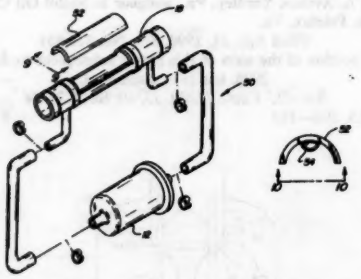
COOLING SYSTEM FILTER

Stuart M. Barnette, Rte. 1, Box 1586, Burnsville, N.C. 28714

Filed Sep. 9, 1991, Ser. No. 756,593

Int. Cl.[5] B01D *35/143*

U.S. Cl. 210—95 **1 Claim**



1. A coolant filter assembly for use with a circulating liquid cool and system, said filer assembly comprising:

a conduit serially positionable within said coolant system, whereby all liquid coolant flowing through said coolant system will flow into said conduit, said conduit having first and second open ends;

a pickup tube comprising a first U-shaped tube of a rigid construction and being fixedly secured within said conduit, said pickup tube having a first coolant receiving end directed towards said fist open end upstream of liquid coolant flow within said conduit, whereby a quantity of liquid coolant moves through said pickup tube when said liquid coolant is flowing through said coolant system, said pickup tube being mounted within a first through-extending aperture formed in a side wall of said conduit, wherein a first fluid discharge end of said pickup tube is positioned exteriorly of said conduit;

a return tube comprising a second U-shaped tube of a rigid construction and being fixedly secured within said conduit, said return tube having a second coolant receiving end positioned exteriorly of said conduit, said return tube being mounted within a second through-extending aperture formed in said side wall of said conduit wherein a second fluid discharge end of said return tube is positioned interiorly of said conduit and is directed towards said second open end downstream relative to a flow of said liquid coolant within said conduit;

a fuel filter for continually cleansing said quantity of said liquid coolant, said fuel filter being in fluid communication with and mounted between said first fluid discharge end of said pickup tube and i second coolant receiving end of said return tube, whereby said quantity of said liquid coolant continually passes therethrough when said liquid coolant is flowing through said coolant system;

sight glass means for facilitating a determination of liquid coolant cleanliness, thereby providing an indication of when to replace said fuel filter, said sight glass means being of a transparent construction so as to permit a visual inspection of flowing liquid coolant within said coolant system, said sight glass means comprising a wall section of said conduit; and

debris collection means operably attached within said sight glass means, said dries collection means being operable to collect contaminants from said liquid coolant, said contaminants being visible through said sight glass means so as to further facilitate a determination of liquid coolant cleanliness, said debris collection means comprising a funnel-shaped collection chamber having an imperforate wall integrally attached to an interior wall section of said sight glass means, said collection chamber including an open end facing the first open end of said conduit and a neck portion having a closed end facing the second open end of said conduit, the neck portion having a reduced diameter relative to the diameter of the open end of said collection chamber where debris collects over a period of time, said neck portion being fillable with debris and operating as a signal to replace said fuel filer when said neck portion becomes totally filled with said debris.

5,160,428

CONTINUOUS FILTER PRESS

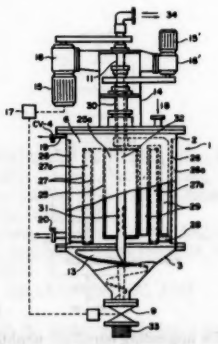
Setsuya Kuri, Kamakura, Japan, assignor to Kuri Chemical Engineers, Inc., Tokyo, Japan

Filed Jul. 23, 1990, Ser. No. 555,619

Claims priority, application Japan, Jul. 24, 1989, 1-188927

Int. Cl.[5] B01D *29/66*

U.S. Cl. 210—107 **9 Claims**



1. An enclosed and continuous filter press comprising:

a pressure vessel;

a filter zone within said pressure vessel partitioned by a filter into a filtrate chamber (A) and a chamber (B) for containing a slurry and a filter cake, said chamber (B) having a slurry feed inlet, said slurry feed inlet including a slurry feed inlet valve;

a cake compressing zone disposed within said pressure vessel below and connected to said chamber (B) for compressing filter cake falling from the chamber (B);

a cake discharging control valve connected to said cake compressing zone for discharging cake compressed in said zone;

a rotatable hollow shaft, having an axis, passing through the filter zone and the cake compressing zone and having a

compacting screw at a portion thereof positioned in the cake compressing zone;

motor means for applying torque to said hollow shaft to rotate said hollow shaft about said axis;

a means to feed a slurry to be filtered under pressure to said slurry feed inlet;

said filter comprises (a) an outer cylindrical filter provided along an inner wall of said pressure vessel, (b) an inner cylindrical filter provided around said hollow shaft, and (c) a doughnut-shaped filter provided between said filters (a) and (b), these filters (a), (b) and (b) being arranged coaxially with said hollow shaft;

said chamber (A) comprises a first filtrate collecting chamber which is a space between said inner wall of said pressure vessel and said filter (a), a second filtrate collecting chamber which is an internal space between said hollow shaft and said filter (b) and a third filtrate collecting chamber which is an internal space of said filter (c);

a plurality of orifices formed in the portion of said hollow shaft positioned in said second filtrate collecting chamber for receiving filtrate flowing into said second filtrate collecting chamber and discharging said filtrate through an inner space of said hollow shaft;

said first filtrate collecting chamber and said third filtrate collecting chamber being connected by a fluid passage, and filtrate collected in said first and third filtrate collecting chambers being dischargeable from said first filtrate collecting chamber,

a fluid passage line, connected to a filtrate outlet valve and a backwashing liquid inlet valve, connected to said hollow shaft and said first filtrate collecting chamber;

a means for feeding a backwashing liquid under pressure to said backwashing liquid inlet valve;

said filter zone containing blades, rotatably mounted on said hollow shaft for rotation about said axis, said blades being independently driven for rotation about said axis by a drive mechanism in order to scrape off the cake accumulated on said filters (a), (b) and (c);

a first detecting means for detecting the compression extent of the cake in said cake compressing zone by measuring torque variations of said hollow shaft and generating a first control signal in response thereto;

a first control means for opening and closing said cake discharge control valve in response to said first control signal;

a second detecting means for detecting the plug-up of said filters (a), (b) and (c) and generating a second control signal in response thereto;

a second control means for closing said filtrate outlet valve and said slurry feed inlet valve and opening said backwashing liquid inlet valve in response to said second control signal to stop discharge of filtrate from the chamber (A) and feed a backwashing liquid under pressure to the chamber (A) for a predetermined period of time; and

relief valve means responsive to said second control means for releasing a small amount of slurry from said chamber (b) during the feeding of the backwash liquid, whereby a pressure in chamber (B) is reduced and backwashing is performed.

5,160,429
PIPING SYSTEM FOR SUPPLYING ULTRA-PURE WATER

Tadahiro Ohmi, 1-17-301, Komegabukuro 2-chome, Aoba-ku, Sendai-shi, Miyagi-ken 980; Michiya Kawakami; Tadashi Shibata, both of Sendai, and Masaru Umeda, Tokyo, all of Japan, assignors to Tadahiro Ohmi, Miyagi, Japan

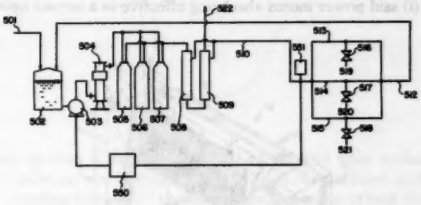
PCT No. PCT/JP90/00648, § 371 Date Dec. 31, 1990, § 102(e) Date Dec. 31, 1990, PCT Pub. No. WO90/00155, PCT Pub. Date Jan. 11, 1990

PCT Filed Jun. 29, 1989, Ser. No. 635,590

Claims priority, application Japan, Jun. 29, 1988, 63-162013

Int. Cl.[5] B01D *61/22, 61/00*

U.S. Cl. 210—137 **11 Claims**



1. A piping system for supplying ultra-pure water to an ultra-pure water using unit, the piping system comprising:

a circulation tank for storing primary pure water;

a pump in fluid communication with said circulation tank for pumping primary pure water from said circulation tank;

an outward pipe having one end connected to said pump;

final purifying means for purifying primary pure water supplied by said pump into ultra-pure water, said final purifying means in fluid communication with said outward pipe;

a connection pipe having an end connected to the other end of said outward pipe;

a branching pipe connected intermediate the ends of said connection pipe and adapted to be in fluid communication with said ultra-pure water using unit;

a branching valve disposed in said branching pipe for adjusting a quantity of ultra-pure water supplied to said ultra-pure water using unit;

a return pipe connected between the other end of said connection pipe and said circulation tank; and

control means connected to said outward pipe for controlling the output of said pump for maintaining the water pressure in said outward pipe at a constant level;

wherein the energy loss when the ultra-pure water is passed through said connection pipe upstream of the connection of said branching pipe is equal to the energy loss when ultra-pure water is passed through said connection pipe downstream of the connection with said branching pipe.

5,160,430
CAR WASH SYSTEM USING REVERSE OSMOSIS CONCENTRATE FOR INITIAL RINSING AND PERMEATE FOR FINAL RINSING

William J. Gasser, Palatine; Timothy J. Carco, Elgin, and Anthony J. Justin, Chicago, all of Ill., assignors to Brite-O-Matic Manufacturing, Inc., Arlington Heights, Ill.

Filed Sep. 25, 1991, Ser. No. 765,188

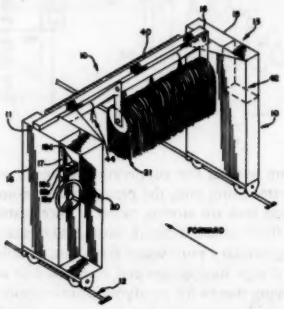
Int. Cl.[5] B01D *17/12;* B60S *3/04*

U.S. Cl. 210—138 **5 Claims**

1. A car wash and rinse machine utilizing permeate from a reverse osmosis process for a final rinse operation, comprising:

(a) a carriage mounted and adapted for travel on parallel tracks in one direction from one end of a stationary car to an opposite, other end of said car and in the opposite direction back;

(b) said carriage having separate first and second car spray means mounted thereon;
(c) a source of raw water;
(d) a reverse osmosis unit means for receiving raw water from the source and separating it into permeate and concentrate;
(e) means for directing raw water and concentrate to one holding tank;
(f) means for directing permeate to another holding tank;
(g) power means effective in a first operation to move said carriage in said one direction and in said opposite direction;
(h) control means effective when operated during said first operation to cause raw water and concentrate to be delivered to said first spray means to wash and subsequentially initially rinse said car while said carriage is moving from one end of said stationary car to the other end and back;
(i) said power means also being effective in a second operation to move said carriage again in said one direction and in said opposite direction;



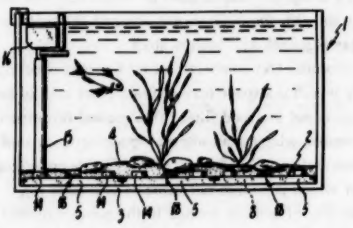
(j) said control means being effective during said second operation to cause permeate to be delivered to said second spray means to final rinse said car while said carriage is traveling for a second time in at least one of said directions.

2. The car wash and rinse machine of claim 1 further characterized in that:
(a) said control means is operable to cause a final rinse to be performed only if a wash and initial rinse has first been performed by the machine.

3. The machine of claim 2 further characterized in that:
(a) said control means includes timing means for setting a time period during which the final rinse must be performed;
(b) said timing means being automatically energized to start said time period running when the control means is operated to initiate the wash and initial rinse.

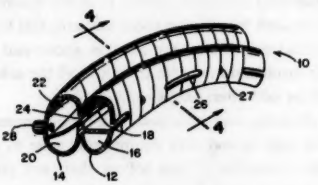
5,160,431
FILTER FOR AQUARIUMS
Elio Marioni, Dueville, Italy, assignor to Askoll S.p.A., Povolaro Sud-Dueville, Italy
Filed Jun. 3, 1991, Ser. No. 709,475
Claims priority, application Italy, Jun. 14, 1990, 41629 A/90
Int. Cl.[5] A01K *63/04*
U.S. Cl. 210—169 **3 Claims**

1. An improved filter comprising a perforated plate (5) which is arrangeable on an aquarium bottom (3), said perforated plate comprising:
a substantially planar supporting surface (6);
means (7) for supporting said planar supporting surface above said aquarium bottom so as to define an interspace (8) between said planar supporting surface and said aquarium bottom;
a plurality of slots (9) which are provided in said planar supporting surface for allowing liquid flow therethrough into said interspace;
partition means (11) which are connected to said planar supporting surface and which protrude therefrom so as to divide said interspace into: a plurality of separate areas (10); a longitudinal passage (12); and an end region which is in communication with said longitudinal passage; and
a plurality of openings (13) for allowing liquid flow from said plurality of separate areas to said longitudinal passage;



the filter further comprising:
at least one manifold element (14) provided in said planar supporting surface at said end region;
at least one recirculation pump (16) connected to said manifold for pumping liquid from said end region back into said aquarium; and
cutoff means (20) for throttling liquid flow from said longitudinal passage into said end region.

5,160,432
OIL CONTAINMENT BOOM AND SKIMMER
Peter Gattuso, 41-99 Parsons Blvd., Flushing, N.Y. 11355
Filed May 3, 1991, Ser. No. 693,318
Int. Cl.[5] E02D *15/10*
U.S. Cl. 210—242.3 **12 Claims**



1. A flexible and collapsible passive oil containment boom and skimmer extending at least partially about, containing against further dispersion, and skimming an oil spill area from a contaminated body of water, comprising:
a first longitudinally extending tubular member for placement adjacent to and facing the oil spill area, including a first inner open area for receiving oil and water and inlet means for admitting oil and water to said first inner open area, said inlet means extending longitudinally along said first longitudinally extending tubular member and facing the oil spill;
a second longitudinally extending tubular member placed parallel to said first member and facing away from the oil spill area, and including a second inner open area in communication with said first inner open area;
skimming means located between said members and at a greater elevation than said inlet means so as to skim oil from the oil and water in said first inner open area and deposit and confine it in said second inner open area; and
flotation means for buoyancy located generally below said inlet means and said skimming means.

5,160,433

LABORATORY SCALE ULTRAFILTRATION APPARATUS

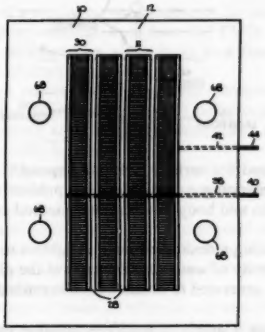
Lawrence J. Niesen, 260 Prospect Ave., Apt. 859, Hackensack, N.J. 07601

Division of Ser. No. 269,640, Nov. 10, 1988, Pat. No. 4,997,565, which is a continuation-in-part of Ser. No. 874,549, Jun. 16, 1986, Pat. No. 4,801,381. This application Jul. 30, 1990, Ser. No. 559,631

The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.

Int. Cl.[5] B01D *61/18*

U.S. Cl. 210—321.84 **27 Claims**



1. Cross-flow apparatus for separating a base liquid into a permeate fraction and a retentate fraction comprising:

semi-permeable membrane means for separating the base liquid into the fractions;

a plurality of base liquid flow channel means, each disposed on a first side of said membrane means and being dimensioned for channeling the flow of the base liquid substantially tangentially across said membrane means, a portion of said base liquid comprising said permeate fraction flowing through said membrane means and into a plurality of permeate flow channel means disposed on an opposite second side of the membrane means, said permeate flow channel means being disposed on a support means for carrying said membrane means, said base liquid flow channel means having means therein for creating turbulence in the flow of said base liquid, the turbulence being created adjacent the first side of the membrane means, to inhibit deposition of solids in said base liquid on the first side of the membrane means.

5,160,434

FILTER CYLINDER WITH DRAINAGE SURFACE

Jukka Heino, and Raimo Kohonen, both of Savonlinna, Finland, assignors to A. Ahlstrom Corporation, Noormarkku, Finland

PCT No. PCT/FI90/00168, § 371 Date May 1, 1991, § 102(e) Date May 1, 1991, PCT Pub. No. WO91/00767, PCT Pub. Date Jan. 24, 1991

PCT Filed Jun. 26, 1990, Ser. No. 663,876

Claims priority, application Finland, Jul. 6, 1990, 893288

Int. Cl.[5] B01D *33/056*

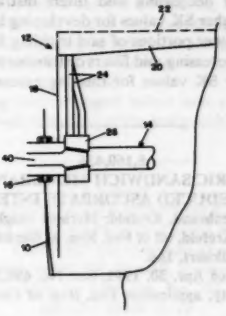
U.S. Cl. 210—391 **5 Claims**

1. A filter cylinder rotatable in a tank and including a substantially cylindrical member having an axis and being covered by a filter surface, said filter cylinder comprising a plurality of adjacent axially extending filtrate compartments below said filter surface, each said compartment comprising:

a bottom part spaced from said filter surface;

a filtrate impermeable continuous side wall, which, when viewed in the direction of rotation, is a leading sidewall, having an outer edge and extending from said bottom part toward said filter surface and in contact therewith;

a protrusion extending at an angle relative to said filter surface from said outer edge inwardly toward said bottom part of said compartment, terminating within said compartment; and



an opening in said bottom part, facing said filter surface, between said leading sidewall of said compartment and a leading sidewall of an adjacent compartment of said filter cylinder.

5,160,435

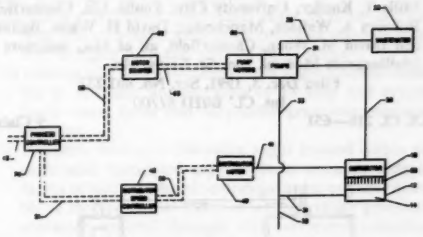
METHOD AND SYSTEM FOR BIO-MASS MANAGEMENT OF A TRICKLING FILTER

Orris E. Albertson, 1915 Wasatch Dr., Salt Lake City, Utah 84108

Continuation-in-part of Ser. No. 659,739, Feb. 25, 1991. This application Aug. 12, 1991, Ser. No. 744,457

Int. Cl.[5] C02F *3/04*

U.S. Cl. 210—614 **13 Claims**



1. A trickling filter comprising:

(a) a tank having a liquid inlet for receiving an influent flow of wastewater and an outlet;

(b) a media to which a bio-mass is fixed is maintained within said tank;

(c) a rotatable or transverse distributing means mounted above said media for evenly distributing said influent flow of wastewater over said bio-mass;

(d) a remotely controlled, variable speed motor for driving said distributing means;

(e) a controlling means operably connected to said variable speed motor for varying the rotatable speed of said distributing means to provide a modulating SK value over a twenty-four hour period;

(f) a signal means for transmitting information to said controlling means for modulating said SK value to provide a SK value most conducive to reducing the BOD_5 and NH_4N level, a SK value for removing excess bio-mass and

a SK value for developing lower portions of said bio-mass all over a twenty-four hour period.

8. A method for optimizing the operations of a trickling filter over a twenty-four hour period comprising the steps of:

(a) modulating said filter's distributor speed to achieve SK values most conducive for reducing $BOD_5 + NH_4N$ levels in a wastewater influent;

(b) gradually decreasing said filters distributor speed to achieve higher SK values for developing bio-mass located near the lower portions of said trickling filter; and

(c) further decreasing said filters distributor speed to achieve still higher SK values for flushing excess bio-mass from said filter.

5,160,436

ASYMMETRIC SANDWICH MEMBRANE SYSTEM HAVING REDUCED ASCORBATE INTERFERENCE

Karlheinz Hildenbrand, Krefeld; Herbert Hugl, Gladbach, and Rolf Dhein, Krefeld, all of Fed. Rep. of Germany, assignors to Miles Inc., Elkhart, Ind.

Filed Apr. 30, 1991, Ser. No. 693,379

Claims priority, application Fed. Rep. of Germany, May 11, 1990, 4015157

Int. Cl.[5] B01D *69/00*

U.S. Cl. 210—638 **6 Claims**

1. A diagnostic test device for detecting the presence of an analyte in a fluid sample which device comprises a fluid permeable support member having a layer on one side thereof of a macroporous membrane comprising polyethyleneimine having impregnated therein iodate ion and on the other side of the support member having a layer of a microporous membrane having dispersed therein a chromogenic indicator which provides a colored response upon being oxidized.

5,160,437

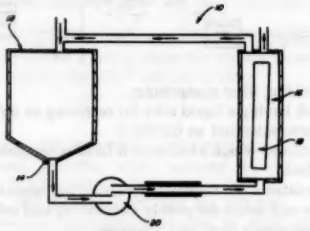
PURIFICATION OF CRUDE IOVERSOL USING REVERSE OSMOSIS

Mark E. Bosworth, Chesterfield; Thomas J. Dunn, Cedar Hill; Warren E. Hall, St. Louis; Richard G. Johnson, Chesterfield; Mills T. Kneller, University City; Youlin Lin, Chesterfield; Rebecca A. Wallace, Manchester; David H. White, Ballwin, and David M. Wong, Chesterfield, all of Mo., assignors to Mallinckrodt Medical, Inc., St. Louis, Mo.

Filed Dec. 3, 1991, Ser. No. 801,233

Int. Cl.[5] B01D *61/00*

U.S. Cl. 210—651 **9 Claims**



1. A method for the purification of crude Ioversol comprising the steps of:

a) passing said crude Ioversol into a housing cartridge containing a cross-linked membrane; and

b) applying pressure within said housing cartridge to force said crude Ioversol into said cross-linked membrane whereby low molecular weight impurities within said crude Ioversol are forced through pores in said cross-linked membrane while purified Ioversol passes over said cross-linked membrane.

5,160,438

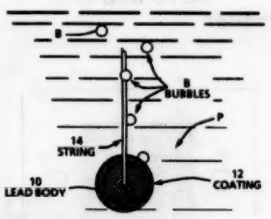
METHOD AND MEANS OF SAMPLING LARGE REGIONS OF LIQUID FOR POLLUTION OR BIOLOGICAL ACTIVITY USING BUBBLES

Richard M. Detsch, Panama City Beach, Fla., assignor to The United States of American as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 28, 1990, Ser. No. 635,072

Int. Cl.[5] C02F *1/24*

U.S. Cl. 210—707 **1 Claim**



1. A method for surfacing debris suspended in a body of water by generating gas bubbles of a predetermined bubble spectra within said body of water, said method comprising the steps of:

a. determining a desired number of bubbles to be generated in said body of water as a function of the diameter of the bubbles generated to obtain a predetermined bubble spectra;

b. providing a supply of bubble-generating particles which react with the water in said body of water to form bubbles within said body of water, said supply of bubble-generating particles having been selected in size, shape, and density to provide bubbles having said predetermined bubble spectra within said body of water; said particles comprising a chemical which is reactive with water to form said bubbles and ranging in size from about fifty microns to about one centimeter;

c. dispersing said supply of bubble-generating particles in preselected patterns onto the surface of said body of water to form bubbles having said predetermined bubble spectra;

d. allowing the bubbles to rise to the surface of said body of water thereby collecting and surfacing debris suspended in said body of water.

5,160,439

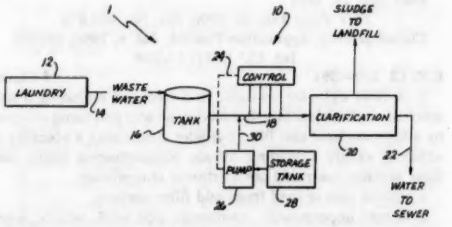
SYSTEM FOR CONTROLLING COAGULANT TREATMENT BASED ON MONITORING OF PLURAL PARAMETERS

John G. Dobrez, Flossmoor, and Michael A. Reeks, Tinley Park, both of Ill., assignors to Dober Chemical Corporation, Midlothian, Ill.

Filed Jun. 21, 1991, Ser. No. 718,764

Int. Cl.[5] C02F *1/52*; B01D *21/30*

U.S. Cl. 210—709 **18 Claims**



15. A method for controlling the amount of a treatment

composition to be introduced into an aqueous medium having a FOG level which is to be reduced, said method comprising:

determining a plurality of different parameters, other than FOG level, of one or more materials comprising an aqueous medium having a FOG level which is to be reduced, at least two of said parameters being determined downstream of said introduction and upstream of said reduction of the FOG level;

generating a plurality of determined signals each of which is indicative of one of said plurality of different determined parameters;

providing said plurality of determined signals to an automatic processor;

providing said automatic processor with a relationship of the amount of a treatment composition to be introduced into said aqueous medium to reduce the FOG level of said aqueous medium to a given level as a function of said plurality of determined signals;

generating a control signal from said automatic processor, said control signal being based on said automatic processor processing said plurality of determined signals in accordance with said relationship;

providing said control signal to a source of treatment composition which provides said treatment composition to said aqueous medium; and

operating said source of treatment composition in response to said control signal to control the amount of said treatment composition from said source of treatment composition to said aqueous medium.

18. The method of claim 15 wherein said aqueous medium is a laundry waste water, said parameters include turbidity and electric charge value, and said treatment composition includes a cationic coagulant.

5,160,440

PROCEDURE FOR THE DEWATERING OF SEWAGE SLUDGE AND PLANT FOR PROCEDURE EXECUTION

Josef Mérai, Sulzbachtalstr. 38, 6603 Sulzbach, Fed. Rep. of Germany

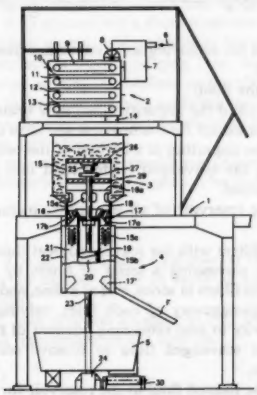
PCT No. PCT/EP87/00641, § 371 Date Apr. 13, 1990, § 102(e) Date Apr. 13, 1990, PCT Pub. No. WO88/03048, PCT Pub. Date May 5, 1988

PCT Filed Oct. 29, 1987, Ser. No. 391,532

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1986, 3636727

Int. Cl.[5] C02F *11/14*

U.S. Cl. 210—710 **5 Claims**



1. A plant for producing dewatered sludge cake comprising:

a) a conditioner station for receiving chemically pretreated sludge and transporting said sludge to an upper pre-dehydration belt of a pre-dewatering station,

b) a pre-dewatering station for receiving sludge from said conditioning station having at least two pre-dehydration belts superposed in different layers, connected in zigzag series and having at least one chute for discharging sludge from a higher belt to a lower belt,

c) a sludge silo below the pre-dewatering station in which the pre-dehydrated sludge is conveyed by gravity,

d) a press station arranged below the sludge silo having at least one filter press for producing a sludge cake from said predehydrated sludge, and

e) a crushing unit arranged below said press station for receiving and crumbling of the sludge cake from said filter press.

5,160,441

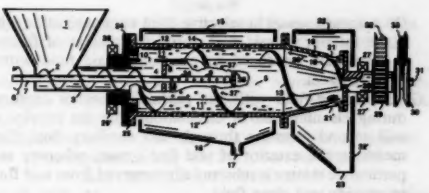
METHOD OF CONTINUOUS CENTRIFUGAL REMOVAL OF RESIDUAL LIQUID WASTE FROM RECYCLABLE CONTAINER MATERIAL

Lynn C. Lundquist, 10833 NE. Russell, Portland, Oreg. 97220

Filed May 17, 1991, Ser. No. 701,778

Int. Cl.[5] B01D *33/15*

U.S. Cl. 210—781 **12 Claims**



1. A method of continuous centrifugal removal of residual liquid waste from recyclable granulated container material wherein a continuous centrifugal apparatus separates said recyclable granulated container material from said residual liquid waste, said method comprising:

a) filling a perforated centrifugal auger cylinder assembly with said recyclable granulated container material which is co-mingled with said residual liquid waste;

b) rotating said perforated centrifugal auger cylinder assembly at sufficient angular velocity to strip said residual liquid waste from said recyclable granulated container material;

c) rotatably driving a conveying auger located within said perforated centrifugal auger cylinder assembly independently of said perforated centrifugal auger cylinder assembly so that the rate of travel of said recyclable granulated container material through said perforated centrifugal auger cylinder assembly proceeds at a predetermined rate; and,

d) radially arranging a series of bleed holes on the exterior portion of said perforated centrifugal auger cylinder assembly whereby said residual liquid waste is transported from a conveying portion of said continuous centrifugal apparatus to a liquid waste containment housing.

5,160,442

METHOD OF CLEANING A DISPOSABLE CARTRIDGE FILTER

John R. Hampton, and Thomas L. Asher, both of Houston, Tex., assignors to Filtration Technology Corporation, Houston, Tex.

Filed Apr. 19, 1990, Ser. No. 510,965

Int. Cl.[5] B01D *29/62*

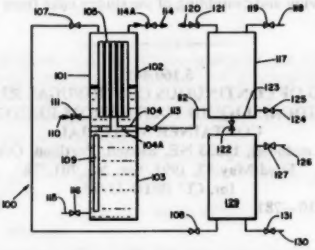
U.S. Cl. 210—791 **2 Claims**

1. The method of cleaning a disposable cartridge filter while in a vessel incorporated into a filtering system used to remove

contaminate particulate matter from fluid circulatable into, through and out of an industrial operation, said method comprising the steps of:

(1) providing a filtering system comprising:

(a) a first vessel housing at least one disposable cartridge filter, said first vessel defining first and second chambers in fluid communication with one another, said first chamber housing said disposable cartridge filter and said second chamber capturing particulate matter from said fluid during circulation and/or cleaning of said fluid, said second chamber housing at least one auxiliary fluid filter means;



(b) a storage vessel in selective fluid communication with the interior of said first vessel for receipt of filtered clean fluid produced by circulating said fluid within said system;

(2) circulating fluid with said particulate matter captured during cleaning and/or circulation from the interior of said second chamber through said auxiliary fluid filter means to the exterior of said first vessel, whereby said particulate matter is substantially removed from said fluid to provide said clean fluid.

5,160,443

LIQUID RECYCLING SYSTEM

John S. Mesheau, Granby, Mass., assignor to Butler Associates, Ludlow, Mass.

Continuation of Ser. No. 482,342, Feb. 20, 1990, Pat. No. 5,026,488. This application Apr. 18, 1991, Ser. No. 686,984

The portion of the term of this patent subsequent to Jun. 25, 2008, has been disclaimed.

Int. Cl.[5] B01D *17/02*

U.S. Cl. 210—799 **13 Claims**

2. A method of recycling contaminated liquid, which comprises:

a. pumping recycling liquid through a filter-loop assembly that includes the steps of:

i. adjusting the flow-rate of recycling liquid as it is pumped through the filter-loop assembly;

ii. passing the flow-rate adjusted recycling liquid through a mechanical separator;

iii. testing the separated recycling liquid to determine the quality of separation; and

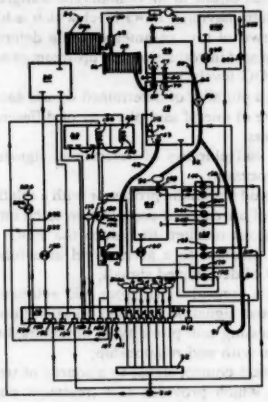
b. pumping the recycling liquid from the filter-loop assembly through an additive-loop assembly, when contaminates have been substantially separated from the recycling liquid by the filter-loop assembly, that includes the steps of:

i. testing the separated recycling liquid to determine what additive compounds are needed, and the quantity of any said additive compounds needed, to achieve desired recycling;

ii. adjusting additive metering valves to inject quantities of additive compounds into the separated recycling liquid determined by the testing;

iii. directing the separated recycling liquid to flow by an additive suction "T"-joint;

iv. directing additive compounds through the adjusted additive compound metering valves, and through the additive suction "T"-joint into the separated recycling liquid;



v. directing the separated, additive-injected recycling liquid to flow out of the additive-loop assembly.

5,160,444

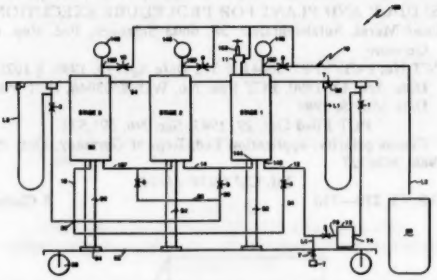
COOKING OIL FILTERING METHOD AND APPARATUS

George E. McFarland, 5316 Lana St., Carm, Calif. 95608

Filed Sep. 19, 1988, Ser. No. 245,907

Int. Cl.[5] B01D *27/10, 27/14, 37/00*

U.S. Cl. 210—805 **20 Claims**



1. A method for removing solid impurities from a fluid, the step including:

preheating the fluid,

scavenging all of the impurity laden now heated fluid from a reservoir except for the heaviest and most densely laden fluid borne impurities at a bottom of the reservoir,

transferring the scavenged heated fluid into a temporary storage vessel,

cleaning the reservoir of all impurities, including residual fluid,

preheating filters with the scavenged heat fluid,

additionally preheating a series of filters by alternatively heating the filters in series, one at a time, and only heating an inlet passageway of each filter, relying on thermal conductivity to heat remaining portions of the filter,

filtering the scavenged fluid to remove solid impurities therefrom,

returning the filtered fluid to the reservoir for reuse,

and topping off the reservoir with new fluid to replenish unreclaimed fluid.

5,160,445

BORATE CROSS-LINKING SOLUTIONS

Sharif Sharif, Midland, Tex., assignor to Zirconium Technology Corporation, Midland, Tex.

Filed May 24, 1991, Ser. No. 705,605
Int. Cl.[5] E21B 33/138
U.S. Cl. 252—8.551 10 Claims

1. A method of preparing a boron cross-linking solution for gelling aqueous treating fluids containing hydratable polymers for treating oil and gas reservoirs comprising:

Slurrying boric acid in an aqueous solution of an alpha-hydroxy carboxylic acid at a concentration of from less than 1% up to 25% by weight to form a boron alpha hydroxy carboxylate;

Adding sodium hydroxide, potassium hydroxide, or ammonium hydroxide, sodium carbonate, potassium carbonate, ammonium carbonate, sodium bicarbonate, potassium bicarbonate, ammonium bicarbonate, or water soluble amine or amine derivative until the pH of the aqueous solution is at least 6.5 and all the boron has reacted to form the corresponding boron alpha hydroxy carboxylic acid salt of the alkali metal, ammonia or water soluble amine or amine derivative.

5,160,446

DISPERSANT, VI IMPROVER AND ANTIOXIDANT ADDITIVE, AND LUBRICATING OIL COMPOSITION CONTAINING SAME

Theodore E. Nalesnik, Wappingers Falls, and Maria M. Kapuscinski, Carmel, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed May 22, 1991, Ser. No. 704,163
Int. Cl.[5] C10M 149/06; C08F 210/16, 220/52
U.S. Cl. 252—51.5 A 22 Claims

1. An additive composition prepared by the steps comprising:

(A) reacting a copolymer, selected from the group consisting of ethylene copolymers prepared from ethylene and at least one C_3–C_{10} alpha-monoolefin and, optionally, a non-conjugated diene and triene, and block copolymers prepared from styrene and a diene monomer having from 4 to 6 carbon atoms, said copolymer having a number average molecular weight ranging from about 25,000 to 300,000, with at least one olefinic carboxylic acid acylating agent to form one or more acylating reaction intermediates characterized by having a carboxylic acid acylating function in their structure;

(B) reacting said reaction intermediate in (A) with an unsaturated hydrocarbyl amine represented by the formula:

$$RNH_2$$

in which R is an unsaturated hydrocarbyl radical having from 3 to 24 carbon atoms to form an imide reaction product; and

(C) reacting said reaction product in (B) with a nitroso compound represented by the formula:

$$R—N=O$$

in which R is an aromatic hydrocarbon radical or aromatic amine radical having from 12 to 20 carbon atoms.

5,160,447

COMPRESSED POWDER MAGNETIC CORE AND METHOD FOR FABRICATING SAME

Masayuki Ishikawa; Tadashi Taguchi, and Yasuhiko Tsuchihashi, all of Komagane, Japan, assignors to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Filed Feb. 21, 1989, Ser. No. 313,612
Claims priority, application Japan, Feb. 29, 1988, 63-46041; Mar. 3, 1988, 63-50503; Mar. 4, 1988, 63-51161; Mar. 9, 1988, 63-55296
Int. Cl.[5] C04B 35/04; H01F 1/00, 1/26
U.S. Cl. 252—62.54 7 Claims

1. A compressed powder magnetic core for an inner yoke of a linear voice coil motor, said core being a compressed body of a ferromagnetic powder and a hardenable binder resin wherein the sum of the body volume percentage of binder resin in said body and the body volume percentage of voids in said body after compression and hardening and before addition of any void-filling material is greater than about 7 per cent and smaller than about 50 per cent and the body volume percentage of voids in said body after compression and hardening and before addition of any void-filling material is greater than about 5 per cent and less than about 30 per cent and wherein said voids are filled with a hardened filler resin.

5,160,448

GEL DETERGENT COMPOSITIONS CONTAINING A CLAY AND A CROSS-LINKED POLYCARBOXYLIC POLYMER

Robert Corring, Rockaway Township, Morris County, N.J., assignor to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Continuation of Ser. No. 139,357, Dec. 30, 1987, abandoned.
This application May 17, 1991, Ser. No. 704,695
Int. Cl.[5] C11D 3/37; C10D 3/395
U.S. Cl. 252—95 15 Claims

1. An aqueous cleaning composition in gel form having a viscosity on a Haake Rotovisco RV-100 Viscometer at 25° C. under 5 sec^{-1} shear of from about 1,000 to 20,000 cps and under 21 sec^{-1} shear of from about 200 to 5,000 cps, a pH range from 11 to 13, a steady state viscoelastic deformation compliance J_3^e value greater than 0.01, and a light transmittance not lower than 10% through a sample 2 cm thick, said composition comprising:

(i) from 0.1 to 10% of a cross-linked polycarboxylic polymer; and

(ii) from about 0.005 to about 0.1% of a hectorite clay.

5,160,449

SHAMPOO SUSPENSION CONTAINING AMINE FUNCTIONAL POLYDIORGANOSILOXANE

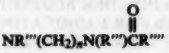
Daniel J. Halloran, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Nov. 2, 1989, Ser. No. 430,750
Int. Cl.[5] C11D 3/30; A61K 7/09
U.S. Cl. 252—174.15 10 Claims

1. A composition comprising a thickener free mixture in the form of a suspension, the suspension including at least one nonionic surfactant, at least one detersive surfactant, water, and an amine functional siloxane polymer having the formula

$$R_{3-z'}Q_{z'}SiO[R_2'SiO]_x[R'QSiO]_ySiQ_zR_{3-z'}$$

wherein R' denotes an alkyl group of 1 to 4 carbons or a phenyl group, with the proviso that at least 50 percent of the total R' groups are methyl; Q denotes an amine functional substitutent of the formula —R''Z, wherein R'' is a divalent alkylene radical of 3 to 6 carbon atoms or a radical of the formula $—CH_2CH_2CH_2OCH_2—CHOHCH_2—$ and Z is a monovalent radical selected from the group consisting of $—NR_2'''$, $—NR'''(CH_2)_nNR_2'''$; and



wherein R'''' denotes hydrogen or an alkyl group of 1 to 4 carbons, R''''' denotes an alkyl group of 1 to 4 carbons and n is a positive integer from 2 to 6; z has a value of 0 or 1; x has an average value of 25 to 3000; y has an average value of 0 to 100 when z is 1, y has an average value of 1 to 100 when z is 0; the amine functional siloxane polymer being present in the suspension in the form of insoluble particles dispersed in the mixture, the particles having a diameter in the suspension of the order of magnitude of about one micron to about one hundred microns, the amine functional siloxane polymer having a mole percent of amine units of the order of magnitude of about 0.05 to about 1.5.

5,160,450

SURFACE-ACTIVE AGENTS HAVING TWO HYDROPHOBIC CHAINS AND TWO HYDROPHILIC GROUPS

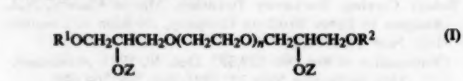
Mitsuo Okahara, Kawanishi, and Araki Masuyama, Suita, both of Japan, assignors to Lion Corporation, Tokyo, Japan

Filed Dec. 5, 1990, Ser. No. 622,473

Int. Cl.[5] C11D *17/00, 1/12, 1/755;* **C07C** *305/00*

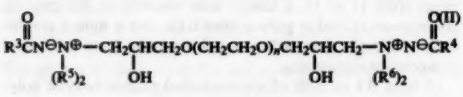
U.S. Cl. 252—174.21 **18 Claims**

1. A surface-active agent, comprising at least one compound selected from the group consisting of a compound of the following general formula (I):



(I)

wherein R^1 and R^2 are independently selected from alkyl and alkenyl groups having 6 to 20 carbon atoms, Z is selected from the group consisting of SO_3H, $PO(OH)_2$, CH_2COOH, $(CH_2)_2SO_3H$ and salts thereof, and n is a number of from 1 to 20, and a compound of the following general formula (II):



(II)

wherein R^3 and R^4 are independently selected from alkyl and alkenyl groups having 5 to 19 carbon atoms, R^5 and R^6 are independently selected from alkyl groups having 1 to 4 carbon atoms, and n is a number of from 1 to 20, wherein the relative proportion of compound (I) to compound (II) is in the range from 100:0 to 0:100, w/w, and wherein said agent is useful as a surface-active agent.

5,160,451

MECHANICAL COMPONENT

Rudolf Eidenschink, Bodenheim, Fed. Rep. of Germany, assignor to Merck Patent Gesellschaft mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP89/00141, § 371 Date Oct. 26, 1989, § 102(e) Date Oct. 26, 1989, PCT Pub. No. WO89/08136, PCT Pub. Date Sep. 8, 1989

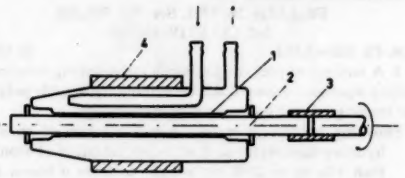
PCT Filed Feb. 16, 1989, Ser. No. 434,696

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1988, 3806055; Mar. 29, 1988, 3810626; Jun. 29, 1988, 3821855; Aug. 12, 1988, 3827351

Int. Cl.[5] C09K *19/52, 19/00*

U.S. Cl. 252—299.01 **17 Claims**

1. Mechanical component consisting essentially of solid bodies which are mobile relative to one another under a variable frictional force and are separated from one another by a thermotropic liquid crystalline mass, characterized in that the change in frictional force is induced very rapidly by phase transitions between different thermotropic liquid-crystalline



phases or between a thermotropic liquid-crystalline phase and an isotropic phase.

5,160,452

STABLE GROUP VIII METALLIC COLLOIDAL DISPERSION

Toshinori Marutsuka, and Osamu Hasegawa, both of Tokyo, Japan, assignors to Nisshinbo Industries, Inc., Tokyo, Japan

Filed Jun. 8, 1989, Ser. No. 362,971

Claims priority, application Japan, Jun. 11, 1988, 63-142758

Int. Cl.[5] B01J *13/00, 23/40*

U.S. Cl. 252—309 **10 Claims**

1. A metallic colloidal dispersion obtained by reducing a salt of a metal selected from the group consisting of nickel and cobalt, with a borohydride compound in a mixed solvent system comprising a lower alcohol and an aprotic polar compound having a weight ratio of 200 to 0.01 aprotic polar compound to 100 of lower alcohol.

5,160,453

CATIONIC AQUEOUS BITUMINOUS EMULSION-AGGREGATE SLURRIES

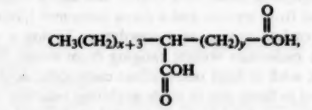
Peter Schilling, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

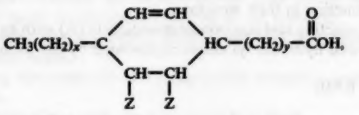
Filed Feb. 21, 1989, Ser. No. 312,817

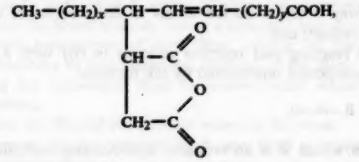
Int. Cl.[5] B01J *13/00;* **B01F** *17/28;* **C08L** *95/00;* **C09D** *201/00*

U.S. Cl. 252—311.5 **6 Claims**

1. A composition of matter obtained by reacting a modified polyamine with certain reactants selected from the group consisting of polycarboxylic acids and anhydrides of the general formulae







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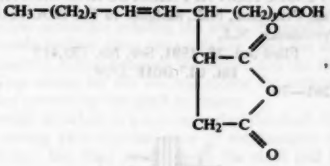
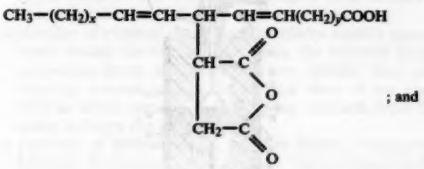
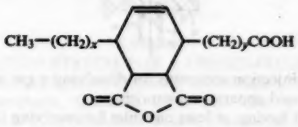




; and



wherein x and y are integers from 3 to 9, x and y together equal 10–14, at least one Z is a carboxylic acid group and any remaining Z is hydrogen and wherein the modified polyamine is obtained by methylene-crosslinking a polyalkylene amine with an aliphatic or aromatic aldehyde.

5,160,454

PROCESS FOR MANUFACTURING ORGANOCLAYS HAVING ENHANCED GELLING PROPERTIES

Milburn I. Knudson, Jr., Gonzales, Tex., and Thomas R. Jones, Cornwall, England, assignors to Southern Clay Products, Inc., Gonzales, Tex.

Continuation-in-part of Ser. No. 771,477, Sep. 3, 1985, Pat. No. 4,664,842, which is a continuation of Ser. No. 561,052, Dec. 12, 1983, abandoned, which is a continuation-in-part of Ser. No. 193,636, Oct. 3, 1980, abandoned. This application May 11, 1987, Ser. No. 48,033

The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.

Int. Cl.[5] B01J *13/00*

U.S. Cl. 252—315.2 **2 Claims**

1. In a process for manufacture of an organoclay by reacting a smectite-type clay with a higher alkyl-containing quaternary ammonium compound; the improvement enabling enhancement of the gelling properties of said clay, comprising:

subjecting the clay as a pumpable slurry, to high speed fluid shear in a dispersion mill, prior to the said reaction thereof with said ammonium compound, by passing said slurry through a narrow gap across which a pressure differential is maintained, said narrow gap being defined between a rotor and a closely spaced stator which vertically surrounds the rotor; said rotor being rotated at a high speed with respect to said stator, and said slurry being subjected to said shearing forces in at least the said narrow gap between said stator and rotor.

5,160,455

FABRICATION OF HOMOGENOUS SOL-GEL DERIVED MULTIPHASE MATERIALS USING GELLING CONTROL AGENTS

David E. Clark, and Kenneth W. Wistrom, both of Gainesville, Fla., assignors to University of Florida, Gainesville, Fla.

Continuation-in-part of Ser. No. 704,913, Feb. 25, 1985, abandoned. This application Sep. 8, 1987, Ser. No. 127,613

Int. Cl.[5] B01J *13/00*

U.S. Cl. 252—315.7 **7 Claims**

1. A method of preparing a gel of a metal oxide selected from the group consisting of Al_2O_3, SiO_2, MgO, ZrO_2, Y_2O_3 and mixtures thereof comprising preparing a sol of metal oxide from a metal alkoxide,

reducing the liquid content of the sol, and then

adding an aqueous solution of a metal salt in an amount corresponding to from about 0.1% to about 5% by weight of metal salt based on the metal oxide in sol to promote controlled gelation.

3. A method of preparing a composite of a metal oxide matrix with reinforcement particles distributed therein in gel form, comprising preparing a sol of metal oxide from a metal alkoxide,

reducing the liquid content of the sol,

adding reinforcement material selected from the group consisting of Al_2O_3, SiC, SiO_2, MgO, ZrO_2, Y_2O_3 and mixture thereof in particulate form in an amount from about 5% by volume to about 90% by volume, and then

adding a control gelling agent in the form of an aqueous solution of a metal salt in an amount corresponding to from about 0.1% to about 5% by weight of the metal salt based on the metal oxide in the sol to promote controlled gelation.

7. The method of claim 3, wherein the metal oxide is Al_2O_3, the reinforcement material is SiC and the control gelling agent is aluminum nitrate.

5,160,456

CATALYST/HEAT-TRANSFER MEDIUM FOR SYNGAS GENERATION

Gerard C. Lahn, Morristown; Frederick J. Kaiser, Jr., Hanover Township, N.J., and Rocco A. Fiato, Basking Ridge, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation of Ser. No. 711,762, Jun. 7, 1991, abandoned. This application Apr. 16, 1992, Ser. No. 870,180

Int. Cl.[5] C01B *3/30, 3/28*

U.S. Cl. 252—373 **8 Claims**

1. In a steam reforming-partial oxidation process for converting, in a fluidized bed or spouted bed reaction zone, a feed gas comprising methane to a product comprising unconverted methane, hydrogen and carbon monoxide at elevated temperatures, in the presence of oxygen, non-catalytic heat carrying solids and catalytic solids, the catalytic solids deactivating during the reaction, the improvement comprising periodically adding to the reaction zone sufficient nickel containing steam reforming catalyst such that the unconverted methane in the product is maintained at no more than a 250° F. approach to equilibrium.

5,160,457

THERMALLY STABLE FORMS OF ELECTRICALLY CONDUCTIVE POLYANILINE

Ronald L. Elsenbaumer, Morristown, N.J., assignor to Allied-Signal Inc., Morristown, N.J.

Continuation-in-part of Ser. No. 82,886, Aug. 7, 1987, Pat. No. 5,069,820. This application Mar. 1, 1989, Ser. No. 317,367

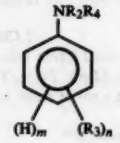
The portion of the term of this patent subsequent to Dec. 3, 2008, has been disclaimed.

Int. Cl.[5] H01B *1/00, 1/06*

U.S. Cl. 252—500 **69 Claims**

1. A thermally stable electrically conductive homopolymer

or copolymer comprising a substituted or unsubstituted polyaniline derived from polymerizing an aniline of the formula:



having therein a dopant solute selected from the group consisting of:

$R_1(PO_3^=)_r$, $R_1(PO_2^-)_r$,

$R_1(PO_3H^-)_r$, $R_1(BO_2^=)_r$, $R(SO_2^-)_r$,

$R_1(-SO_3^-)_r$, $R_1(COO^-)_r$ and $R_1(BO_2H^-)_r$

in an amount sufficient to provide a doped polyaniline having a conductivity of at least about $10^{-6}ohm^{-1}cm^{-1}$ wherein:

R_1 is the same or different at each occurrence and is a substituted or unsubstituted organic radical, amino, alkylamino, dialkylamino, arylamino, diarylamino, or alkylarylamino;

n is an integer from 0 to 4;

m is an integer from 1 to 5 with the proviso that the sum of n and m is 5;

r is an integer equal to or greater than 1;

R_2 and R_4 are the same or different at each occurrence and are R_3 substituents, hydrogen or alkyl; with the proviso that at least one of R_2 or R_4 is hydrogen and with the further proviso that R_2 and R_4 are not alkylsulfonyl, arylsulfonyl or alkanoyl;

R_3 is deuterium, alkyl, alkenyl, alkoxy, cycloalkyl, hydroxy, cycloalkenyl, alkanoyl, alkylthio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, aryl, arylthio, arylsulfinyl, alkoxycarbonyl, alkylsilane, phosphinic acid, arylsulfonyl, phosphonic acid, sulfonic acid, boric acid, phosphoric acid, sulfonate, borate, phosphonate, phosphinate, phosphate, sulfinic acid, sulfinate, carboxylic acid, halo, carboxylate, cyano, or alkyl or alkoxy substituted with one or more phosphonic acid, sulfonic acid, boric acid, sulfinic acid, sulfinate, phosphoric acid, sulfonate, borate, carboxylate, phosphonate, phosphate, carboxylic acid, halo, hydroxy, cyano or epoxy moieties; or any two R_3 substituents or any one R_3 substituent and any one R_2 or R_4 substituent taken together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6 or 7 membered aromatic or alicyclic carbon ring, or any two R_3 substituents or any one R_3 substitutent and any one R_2 or R_4 substituent taken together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6 or 7 membered aromatic or alicyclic carbon ring which includes one or more divalent ester, carbonyl, nitrogen, sulfur, sulfinyl, sulfonyl or oxygen, or R_3 is an aliphatic moiety having repeat units of the formula:

$(OCH_2CH_2)_qO—CH_3$, $(OCH_2CH(CH_3))_qO—CH_3$, $(CH_2)_qCF_3$, $(CF_2)_q CF_3$ or $(CH_2)_q CH_3$

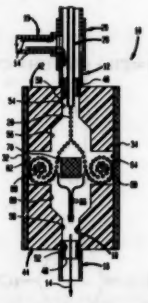
wherein q is a positive whole number; with the proviso that the homopolymer or copolymer includes 10 or more recurring aromatic moieties.

5,160,458

GAS INJECTION APPARATUS AND METHOD

Loo T. Yap, Princeton, N.J., assignor to The BOC Group, Inc., New Providence, N.J.

Filed Jul. 25, 1991, Ser. No. 735,417
Int. Cl.[5] B01F *3/04*
U.S. Cl. 261—76 **7 Claims**



1. A gas injection apparatus for dissolving a gas into a flowing liquid, said apparatus comprising:

a conduit having, at least one inlet for receiving the flowing liquid, at least one outlet for discharging the flowing liquid, and a passageway communicating between the at least one inlet and the at least one outlet and through which the flowing liquid flows in a flow direction taken from the inlet to the outlet; and

injection means in communication with the passageway for injecting the gas into the flowing liquid so that a plurality of undissolved gas bubbles are produced within the flowing liquid;

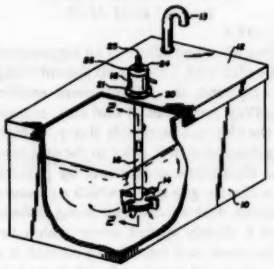
the passageway having at least one rearward facing step for separating the flowing liquid into at least one main flow region flowing in the flow direction and at least one circulating side flow region located along side the at least one main flow region and within which the undissolved gas bubbles circulate and dissolve to produce a concentration gradient driving the gas, once dissolved, from the at least one circulating side flow region to the at least one main flow region.

5,160,459

FLUID MIXER

Claudio Guarnaschelli, and Marco G. Guarnaschelli, both of 5583 Spruce Street, Burnaby, Canada V5C 1Y7

Continuation of Ser. No. 618,760, Nov. 27, 1990, abandoned. This application Jan. 8, 1992, Ser. No. 818,508
Int. Cl.[5] B01F *3/04, 5/10*
U.S. Cl. 261—92 **3 Claims**



1. An apparatus for drawing fluid into a liquid and subsequently mixing the fluid in the liquid comprising:

a rotatable shaft with a hollow passage therein;
an axial fluid intake to the hollow passage at a top end of the shaft;
an electric motor for rotating the shaft, the motor having a rotatable hollow drive sleeve fitting over the shaft with connection means between the sleeve and the shaft;
mounting means for the electric motor for supporting the motor permitting the shaft to rotate;
an impeller attached to a bottom end of the shaft, the impeller having two circular discs of substantially the same diameter, the discs coaxial with the shaft and having a space therebetween, the hollow passage within the shaft in communication with the space between the discs;
a plurality of external radial impeller blades equally spaced apart around the two circular discs, the external blades projecting above and below the two circular discs and tapering inwards to join the external faces of the discs with no sharp corners, and extending outwards from the space between the discs, and
a plurality of internal radial impeller blades, interspaced between the external radial impeller blades located in the space between the discs.

5,160,460

VENTILATION SYSTEM FOR A LIQUID-FILLED BASIN

Helmut Goetz, Regensdorf; Ludwig Scheibinger, Munich, and Peter Steinbach, Kallstadt, all of Fed. Rep. of Germany, assignors to Metz Mannheim GmbH, Mannheim, Fed. Rep. of Germany

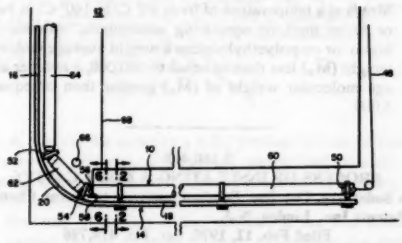
PCT No. PCT/DE89/00388, § 371 Date Jul. 31, 1990, § 102(e) Date Jul. 31, 1990, PCT Pub. No. WO90/08742, PCT Pub. Date Aug. 9, 1990

PCT Filed Jun. 15, 1989, Ser. No. 548,908

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1989, 3902763

Int. Cl.[5] C10J *1/08*; C02F *3/20*; A01K *63/04*

U.S. Cl. 261—122.1 **15 Claims**



1. A ventilation system for a liquid-filled basin having a bottom, which comprises
(a) at least one guide rail affixed to the basin, each guide rail having
(1) a descending intake section,
(2) a horizontal section adjacent the bottom of the basin and
(3) an arcuate section connecting the intake and horizontal sections of the guide rail,
(b) a hose moveable along each guide rail, each hose having a circumferentially extending outer wall and
(1) an intake section associated with the descending intake section of the guide rail,
(2) a horizontal section associated with the horizontal guide rail section and
(3) a connecting section associated with the arcuate guide rail section,
(4) at least one of the hose sections being perforated for permitting air to escape from the hose into the liquid-filled basin,
(c) a plurality of hose holding devices glidably guided along the guide rail and spaced therealong from each other for retaining the hose in position along the guide rail against buoyancy in an operating position of the hose in the liquid-filled basin,
(1) the holding devices being connected to a lower portion of the outer hose wall for guiding the hose along the guide rail, and
(d) a traction device attached to the hose for pulling the hose into the basin as it is guided along the guide rail.

5,160,461

CHILLED BEVERAGE SYSTEM

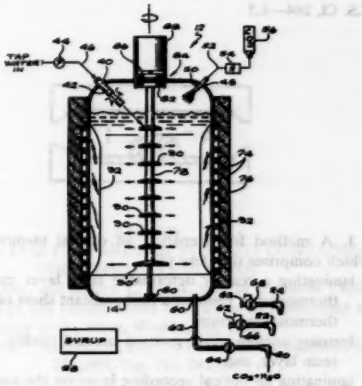
Bruce D. Burrows, Valencia, Calif., assignor to Ebtech, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 653,055, Feb. 11, 1991, Pat. No. 5,085,810, which is a continuation-in-part of Ser. No. 562,244, Aug. 3, 1990, Pat. No. 5,071,595. This application Feb. 3, 1992, Ser. No. 831,803

The portion of the term of this patent subsequent to Dec. 10, 2008, has been disclaimed.

Int. Cl.[5] B01F *3/04*, *5/10*

U.S. Cl. 261—140.1 **7 Claims**



1. A chilled beverage system comprising:
a generally upright reservoir having upper and lower ends;
means for introducing a liquid beverage into said reservoir via an inlet disposed generally at one of said upper and lower ends of said reservoir;
an elongated impeller shaft extending generally centrally and vertically within said reservoir;
means for rotatably supporting said shaft for rotation about its own axis within said reservoir;
drive means for rotatably driving said shaft about its own axis;
a plurality of vaneless impeller disks carried on said shaft in vertically spaced relation for rotation therewith;
refrigeration means mounted at the periphery of said reservoir to chill the beverage within said reservoir sufficient to form an ice ring within the reservoir at the periphery thereof, said impeller disks having radially outer edges disposed in substantial spaced relation to said reservoir periphery; and
dispensing outlet means disposed generally at the other of said upper and lower ends of said reservoir for drawing the chilled beverage from said reservoir, said disks upon rotation of said shaft each pumping the beverage in the vicinity thereof in a generally radially outward direction toward the periphery of said reservoir into direct contact with the ice ring for close heat exchange between the radially outwardly pumped beverage and the ice ring to chill the beverage, whereby said disks collectively pump

beverage introduced into said reservoir into direct contact with the ice ring a plurality of times as such beverage travels between said upper and lower reservoir ends and before such beverage is drawn from said reservoir by said dispensing outlet means, and further whereby said disks collectively provide a plurality of radially outwardly directed beverage flows within said reservoir to minimize the size of the ice ring formed within said reservoir at a periphery thereof.

5,160,462

PREPARING OPTICAL MEMORY MEDIUM BY LAMINATING A THERMOPLASTIC RESIN LAYER ON A THERMOSETTING RESIN SHEET

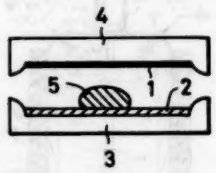
Kohzoh Arahara, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 14,785, Feb. 13, 1987, abandoned. This application Feb. 2, 1990, Ser. No. 473,106

Claims priority, application Japan, Feb. 14, 1986, 61-028903; Feb. 14, 1986, 61-028904; Feb. 14, 1986, 61-028905; Feb. 15, 1986, 61-029884; Feb. 15, 1986, 61-029885; Feb. 15, 1986, 61-029886

Int. Cl.[5] B29D *11/00*

U.S. Cl. 264—1.3 **28 Claims**



1. A method for preparing an optical memory medium which comprises the steps of:

laminating a readily deformable resin layer comprising a thermoplastic resin on a heat-resistant sheet comprising a thermosetting resin,

forming uneven guide grooves on said readily deformable resin layer, and

laminating an optical recording layer on the surface of the readily deformable resin layer on which said uneven guide grooves have been formed.

5,160,463

METHOD OF MANUFACTURING A CONTACT LENS

John M. Evans, Fremont, and Ashok R. Thakrar, San Jose, both of Calif., assignors to Pilkington Visioncare, Inc., Menlo Park, Calif.

Continuation-in-part of Ser. No. 605,704, Oct. 30, 1990, abandoned. This application Jul. 18, 1991, Ser. No. 732,129

Int. Cl.[5] B29D *11/00*

U.S. Cl. 264—17 **20 Claims**

1. A method of manufacturing a contact lens from a liquid monomer which comprises: forming at least one of the contact lens surfaces by moulding, and providing an iris simulating pattern from ink made with a monomeric carrier material that is the same as said liquid monomer, the method further comprising:

applying a first ink design to a mould surface:

applying a second differing ink design to a mould surface:

placing a predetermined amount of said liquid monomer between mould halves positioned to mould at least said one contact lens surface:

polymerising the liquid monomer:

whereby the first and second ink designs are transferred to the contact lens, dispersed in the polymer, during the moulding and curing of the contact lens, and the designs transferred to the contact lens interact with each other to form an iris simulating pattern which is not reliant upon the structure of the natural iris of the eye to give a natural appearance in a different color.

5,160,464

POLYMER IRRADIATION

Ian M. Ward; Denis W. Woods, both of Leeds, England, and Walter K. Busfield, Sunnybank Hills, Australia, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 680,519, Dec. 10, 1984, abandoned. This application Mar. 8, 1988, Ser. No. 180,707

Claims priority, application United Kingdom, Dec. 9, 1983, 8332952

Int. Cl.[5] B29C *35/10, 47/00, 55/00, 71/04*

U.S. Cl. 264—22 **17 Claims**

1. A process for the preparation of an oriented homopolyethylene or co-polyethylene of improved strain rate sensitivity, which process comprises:

(1) Providing the solid homo- or copolyethylene;

(2) Orienting the molecules of said homo- or co-polyethylene to produce a highly oriented product having a 2% secant modulus of at least 10 GPa at a strain rate of 2×10^{-5} sec^{-1};

(3) Subjecting the oriented product to a high energy irradiation of a dosage of at least 1 Mrad and not more than 60 Mrads at a temperature of from 30° C. to 140° C. in vacuo or in an inert or sensitizing atmosphere, wherein said homo- or co-polyethylene has a weight average molecular weight ($\overline{M}_w$) less than or equal to 350,000, a number average molecular weight of ($\overline{M}_n$) greater than or equal to 5,000.

5,160,465

PROCESS OF INSULATING A BODY CAVITY

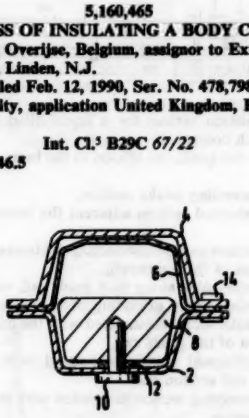
Jan Soderberg, Overijse, Belgium, assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Feb. 12, 1990, Ser. No. 478,798

Claims priority, application United Kingdom, Feb. 13, 1989, 8903211

Int. Cl.[5] B29C *67/22*

U.S. Cl. 264—46.5 **8 Claims**



1. A process of insulating a vehicle body cavity defined by internal metal walls which include the steps of:

assembling a foamable part comprising at least 65 wt. % of a base polymer of ethylene and an olefinically unsaturated methyl acrylate a cross-linking agent, a chemical blowing

agent and a blowing agent activator wherein said base polymer has a melt index MI) of from 0.1 to 6 and comprises from 10 to 40 percent by weight of methyl acrylate in an open space of a vehicle body so that the part is spaced from all surrounding internal metal walls;

submitting the vehicle body to low temperature anti-corrosion treatment whilst the foamable part remains substantially unexpanded; and

submitting the vehicle body to high temperature during treatments under atmospheric pressure in conditions such that the foamable part expands, contacts and adheres to metal surfaces of surrounding walls and forms a sound and moisture insulating plug of closed-cell foam.

5,160,466

METHOD FOR MOLDING A MATERIAL

Peter S. Allan, Iver, and Michael J. Bevis, Uxbridge, both of England, assignors to National Research Development Corporation, London, United Kingdom

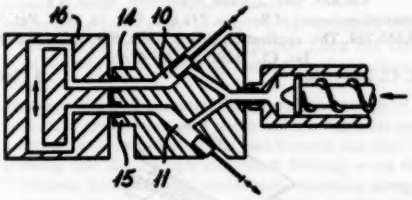
Continuation of Ser. No. 500,376, Mar. 28, 1990, Pat. No. 5,059,368, which is a continuation of Ser. No. 320,695, Mar. 8, 1989, Pat. No. 4,925,161, which is a continuation of Ser. No. 810,654, Dec. 18, 1985, abandoned. This application Aug. 9, 1991, Ser. No. 746,225

Claims priority, application United Kingdom, Dec. 21, 1984, 8432335; May 20, 1985, 8512708

The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.

Int. Cl.[5] B29C *45/02, 45/13*

U.S. Cl. 264—69 **9 Claims**



1. A method for molding a solid product in a mold cavity, from molten material, wherein first and second conduits are coupled to the mold cavity at spaced positions for carrying the molten material, said method comprising:

a first step of driving a first element in the first conduit, having molten material therein, to displace the molten material through the first conduit and into the mold cavity, and then out of the mold cavity and into the second conduit coupled to the mold cavity;

a second step, performed during the operation of said first step, of driving a second element in the second conduit in a direction to permit the flow of the molten material out of the mold cavity and into the second conduit;

a third step of driving the second element in the second conduit in a reverse direction to displace the molten material through the second conduit and into the mold cavity;

a fourth step, performed substantially simultaneously with said third step, of driving the first element in the first conduit in a reverse direction to permit the flow of the molten material out of the mold cavity into the first conduit;

a fifth step of alternately and repeatedly performing said first and second steps simultaneously, and said third and fourth steps simultaneously; and

a sixth step of solidifying the molten material in the mold, wherein said first through fifth steps occur prior to completion of said sixth step.

5,160,467

METHOD FOR PRODUCING BIODEGRADABLE PACKAGING MATERIAL

Michael A. Neri, Rochester, N.Y., assignor to Joseph R. DeGeorge, New York and William J. Every, Rochester, both of, N.Y.

Filed Dec. 5, 1991, Ser. No. 802,534

Int. Cl.[5] B29C *71/00*

U.S. Cl. 264—101 **8 Claims**

1. A method for producing a vacuum-dehydrated, lightweight biodegradable packaging product, comprising boiling a quantity of water,

mixing a quantity of at least one gellable polysaccharide with said quantity of boiling water to form a moldable solution,

pouring said solution into at least one mold and allowing said solution to cool, thereby forming a semi-solid mixture, and

without freezing subjecting said semi-solid mixture to a vacuum-dehydration process to volatize all moisture therefrom, and to produce a biodegradable product which retains its molded configuration upon returning to normal atmospheric pressure.

5,160,468

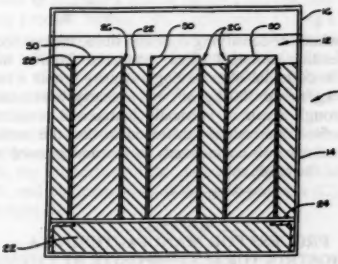
METHOD FOR PREPARING A STORAGE CONTAINER FOR EXPLOSIVE ROUNDS

Carl C. Halsey, and Sharon L. Berry, both of Inyokern, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 559,871, Jul. 27, 1990. This application Feb. 28, 1992, Ser. No. 842,955

Int. Cl.[5] B29C *67/12*

U.S. Cl. 264—112 **4 Claims**



1. A method of manufacturing a storage container for explosive rounds, comprising the steps of:

selecting a collapsible ground or crushed rock that collapses and absorbs a shock associated with an explosive donor detonation;

mixing said rock with a binder to form a composite material;

providing a container;

placing explosive round defining receptacle tubes in the container; and

casting said composite material into said container and around said tubes.

5,160,469

MANUFACTURE OF PELLETS OF XANTHINE DERIVATIVES

Thomas Moest, and Claus H. Pich, both of Moorrege, Fed. Rep. of Germany, assignors to Nordmark Arzneimittel GmbH, Uetersen, Fed. Rep. of Germany

Filed Sep. 7, 1990, Ser. No. 578,442

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1989, 3929864

Int. Cl.[5] B29B *9/08;* **A61K** *9/16, 31/52*

U.S. Cl. 264—117 **4 Claims**

1. A process for the manufacture of pellets which are composed of xanthine derivative and are predominantly spherical, have a particle size in the range from 0.3 to 4 mm and have a bulk density of above 0.5 g/cm^3 by reacting xanthine derivatives with water or water/alcohol mixtures, comprising suspending a powdered xanthine derivative with an average particle size of 20 to 200 μm by stirring at from 40° to 70° C. in a nonsolvent which is immiscible with water and has a boiling point in the range from 60° to 160° C., allowing the xanthine derivative to agglomerate into pellets by adding from 10 to 40% by weight, based on the xanthine derivative, of water or a water/alcohol mixture and subsequently allowing to cool to room temperature at from 5° to 20° C. per hour, and separating the pellets from the liquid and drying.

5,160,470

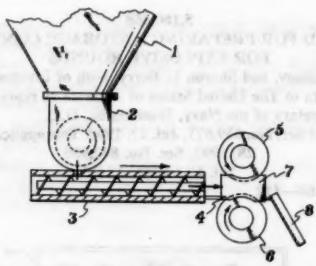
METHOD FOR COMPACTING SILICA FUME

Steven W. Graville, Eugene, Oreg., and Clifford C. Reese, Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed May 20, 1992, Ser. No. 885,791

Int. Cl.[5] B29C *43/00*

U.S. Cl. 264—123 **5 Claims**



1. A method for densifying colloidal silica, the method comprising, feeding colloidal silica recovered from a smelting process, the colloidal silica having a density within a range of about 50 kg/m^3 to 300 kg/m^3, by a nearly horizontal feed means through a pair of vertically juxtaposed pressure rolls having surface depressions positioned so that the surface depressions of one roll corresponds to the undepressed surface portions of the other roll.

5,160,471

PROCESS FOR MANUFACTURING A THERMOSTRUCTURAL COMPOSITE BY CHEMICAL VAPOR DEPOSITION USING LINKING THREADS

Michel Vives, Eysines, and Jean L. Limousin, La Musardiere, both of France, assignors to Societe Europeenne de Propulsion, Sureness, France

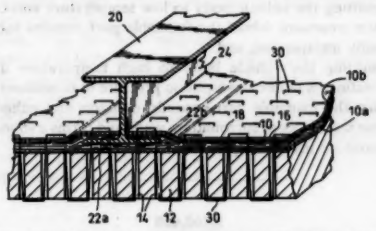
Filed Apr. 3, 1991, Ser. No. 679,777

Claims priority, application France, Apr. 9, 1990, 90 04535

Int. Cl.[5] B32B *31/00*

U.S. Cl. 264—136 **12 Claims**

1. A process for the manufacture of a thermostructural composite material component consisting of a fibrous preform densified by a matrix, said process comprising the steps of producing said fibrous preform, configuring said preform to maintain said preform in a desired shape and with a desired degree of compacting, by linking said preform onto a rigid shaping device by way of threads traversing said preform and



passing through holes in said shaping device to form a configured preform and densifying said configured preform by a chemical vapor infiltration of a material constituting said matrix.

5,160,472

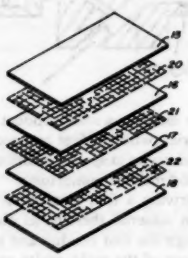
METHOD OF PRODUCING COMPOSITE STRUCTURES OF ULTRA-HIGH-MOLECULAR-WEIGHT POLYMERS, SUCH AS ULTRA-HIGH-MOLECULAR-WEIGHT POLYETHYLENE PRODUCTS

Anagnostis E. Zachariades, 65 Glengarry Way, Hillsborough, Calif. 94010

Division of Ser. No. 262,970, Oct. 26, 1988, Pat. No. 4,944,974, which is a continuation-in-part of Ser. No. 137,200, Dec. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 936,838, Dec. 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 811,015, Dec. 18, 1985, Pat. No. 4,655,769. This application Feb. 9, 1990, Ser. No. 477,628

Int. Cl.[5] B29C *43/20, 43/30*

U.S. Cl. 264—136 **8 Claims**



1. A method of making a single phase composite product, comprising the steps of:

heating a sheet of UHMWPE pseudo-gel comprising 5% UHMWPE in 95% paraffin oil, by weight, to 125° C., so that the pseudo-gel dissolves into a solution,

applying a knitted UHMWPE high modulus, high-strength fibrillar structure on one side thereof, said fibrillar structure being formed from a semicrystalline linear polymer which is the same as said pseudo-gel, with a weight average molecular weight of at least 500,000,

placing the combined layers under compression at about 2,000 psi at about 125° C. to form a unitary composite structure,

lowering the temperature to at least about 100° C., to give a gel-coated UHMWPE knitted structure with high modulus and strength,

removing the paraffin oil from the gel coated structure by extraction with hexane, and

removing the hexane form the gel component of the com-

posite system by evaporation, to obtain a single phase composite of UHMWPE fibers in UHMWPE matrix.

5,160,473

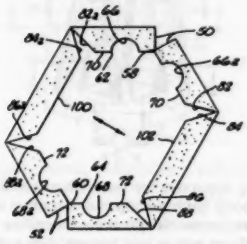
METHOD OF MANUFACTURING FOAM PACKAGING FRAME BLANK

Rick L. Bontrager, Ripon, Calif., assignor to Great Western Foam Products Corporation, Hayward, Calif.

Division of Ser. No. 556,320, Jul. 20, 1990, Pat. No. 5,024,328. This application May 17, 1991, Ser. No. 701,764

Int. Cl.[5] B29C *53/00*

U.S. Cl. 264—138 **3 Claims**



1. The method of forming a single piece connected polyurethane foam packing frame from a blank, said frame to receive a part therein for protection against damage when oriented in a shipping container including the steps of:

preparing a cutting die to provide an elongated central centered cut along the length of said block and cutouts within said block projecting outwardly of said elongated cut;

moving a block of polyurethane wherein the length of said block is greater then said width and the thickness corresponds to at least that of said part beneath said die;

pressing said die through said block forming a cut blank wherein said elongated central cut extending along the greater length terminates within the perimeter of said block and two pair of V shaped corner cutouts are formed on each side of said central cut yet terminating inwardly of the exterior of said block;

opening said block to form said packing frame, said frame forming a quadrilateral with said V shaped corner cutout forming miter corners and an interior configuration formed by said elongated central cut complementary with the exterior configuration of said part.

5,160,474

OVERMOLDED GASKET, HEAT EXCHANGER TANK INCORPORATING THE SAME AND METHOD FOR MAKING THE SAME

James W. Huff, Williamsville, N.Y., assignor to Cadillac Rubber & Plastics, Inc., Cadillac, Mich.

Filed Dec. 21, 1990, Ser. No. 632,363

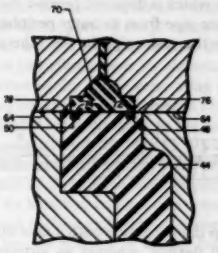
Int. Cl.[5] B29C *65/56*

U.S. Cl. 264—255 **17 Claims**

1. A method for forming a heat exchanger tank having a gasket on a sealing rim of the tank, the method comprising the steps of:

molding a heat exchanger tank with a channel in the sealing rim and a retaining projection on the sealing rim, wherein the retaining projection has a side substantially in common with the channel;

deforming the retaining projection into an upper portion of the channel to thereby provide a stake; and



overmolding a gasket to the tank and into the channel to mechanically interlock the gasket and the tank through the stake.

5,160,475

METHOD OF PRODUCING SHAPED ARTICLES HAVING EXCELLENT IMPACT RESISTANCE

Kuniyoshi Asano, Hirakata; Tomoyoshi Uemura, Ibaraki, and Hiroshi Takida, Takatsuki, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jan. 31, 1991, Ser. No. 648,699

Claims priority, application Japan, Feb. 1, 1990, 2-23020; Oct. 29, 1990, 2-293075

Int. Cl.[5] B29K *96/02*; C08G *81/02*; C08L *23/00*

U.S. Cl. 264—331.170 **1 Claim**

1. A method of producing shaped articles having excellent impact resistance which comprises melt-molding a composition derived from

a saponified ethylene-vinyl acetate copolymer (A) with an ethylene content of 20 to 60 mole % and a degree of saponification of its vinyl acetate component being not less than 95 mole % by incorporating therein

an ethylene-propylene copolymer elastomer (B) with an ethylene content of 30 to 90 weight % and having a density of 0.85 to 0.87 g/cm3 and a glass transition point within the range of −50° C. to −60° C, and

a graft polymer (C) obtained by grafting 0.05 to 10 parts by weight of an ethylenically unsaturated carboxylic acid or derivative thereof to 100 parts by weight of a polyolefin resin to produce a grafted product and reacting the resulting product further with a polyamide having a degree of polymerization of 150 to 500, where the reaction ratio of the polyamide to the grafted product is 0.01 to 1 mole per mole of carboxyl group of the grafted product by mixing the grafted product and the polyamide while in a molten state,

wherein the proportion in the composition of the saponified ethylene-vinyl acetate copolymer (A) is 60 to 80 weight %, the proportion of the elastomer (B) is 10 to 30 weight %, and the proportion of the graft polymer (C) is 5 to 10 weight %.

5,160,476

METHOD FOR PRODUCING A RESIN PIPE FOR USE AS THE INNER LINING OF EXISTING PIPES

Makoto Ijyuin, Osakashi; Akihiko Tsuda, Neyagawashi, and Shinichi Nawata, Nara, all of Japan, assignors to Tsutsunaka Plastic Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sep. 11, 1991, Ser. No. 757,681

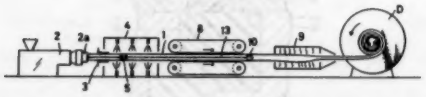
Claims priority, application Japan, Sep. 18, 1990, 2-249698

Int. Cl.[5] B29C *47/90*

U.S. Cl. 264—563 **9 Claims**

1. A method for producing a resin pipe for use as the inner lining of existing pipes, the method comprising the steps of: continuously extruding a resinous material through a circular

die of an extruder so that a resin pipe is formed; pulling thereafter the resin pipe by a traction device causing the resin pipe to successively cool down and solidify before advancing into a reheating device which is disposed beyond the traction device; reheating the resin pipe from its outer periphery so as to make soft and flexible the resin pipe in the reheating device; and



finally reeling up the resin pipe onto a take-up drum while the resin pipe is still flexible, wherein an airtight packing is disposed in the resin pipe between the traction device and the reheating device so that compressed air or gas is introduced into the resin pipe from its open forward end, whereby an internal pressure is imparted to the reheated resin pipe which is being reeled onto the take-up drum.

5,160,477

TEMPERATURE MAINTENANCE AND METALLURGICAL TREATMENT FURNACE

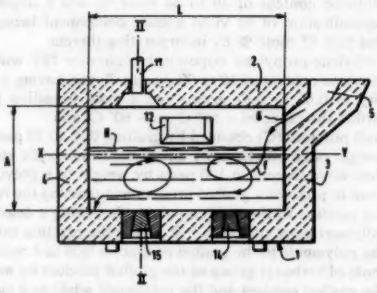
Jean Foulard, Ablon, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Jul. 9, 1991, Ser. No. 727,240

Claims priority, application France, Jul. 13, 1990, 90 08959

Int. Cl.[5] C21C *5/48, 5/50*

U.S. Cl. 266—99 **12 Claims**



1. A furnace for refining and maintaining the temperature of a metal in a molten state, comprising an insulated enclosure defining an inner chamber and having a vault portion, a bottom portion and first and second opposite ends which lie on a main axis of the enclosure, the enclosure being rockable around the main axis between an operative position and a tilted position, the enclosure being formed at said first end with a first upwardly extending duct serving as a gas-exhausting chimney and as a means for introducing liquid metal into the chamber, said first duct opening into the chamber at a location below the vault portion, the enclosure having adjacent said second end a second duct that extends upwardly to the level of said vault portion when said enclosure is in said operative position and that serves as a molten metal discharging means when the enclosure is in said tilted position, the second duct opening into the chamber adjacent said bottom portion, at least one porous plug in said bottom portion for injecting a neutral stirring gas into the chamber, and at least one burner in the vault portion for burning a mixture of a combustible gas and an oxygen-containing gas.

5,160,478

GAS FLUSHING APPARATUS FOR METALLURGICAL VESSEL

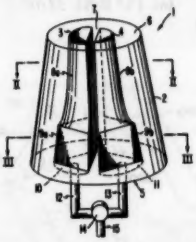
Hans Rothfuss, Tsunusstein; Herbert Metzger, Duisburg; Manfred Winkelman; Hans G. Winkler, both of Krefeld, and Jochen Kopia, Bendorf, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed May 6, 1991, Ser. No. 695,340

Claims priority, application Fed. Rep. of Germany, May 7, 1990, 4014509

Int. Cl.[5] C21C *5/48*

U.S. Cl. 266—200 **25 Claims**



1. A flushing apparatus for use with a metallurgical vessel, comprising a body having a top end, a bottom end, and a pair of discrete gas-permeable portions extending through said body from said top end to said bottom end; and

wherein one of said pair of discrete gas-permeable portions has a cross section which is different than a cross section of the other of said pair of discrete gas-permeable portions.

5,160,479

MOLTEN METAL STIRRING DEVICE

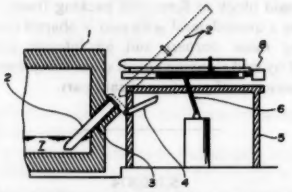
Tsutomu Yoshida; Toshinori Inoue; Toshihiko Shirasawa, all of Sakata, and Takashi Asahina, Tsuruoka, all of Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 614,918, Nov. 16, 1990, abandoned. This application Jun. 28, 1991, Ser. No. 722,325

Claims priority, application Japan, Dec. 15, 1988, 1-325481; Apr. 19, 1990, 2-42064[U]

Int. Cl.[5] B22D *41/62*

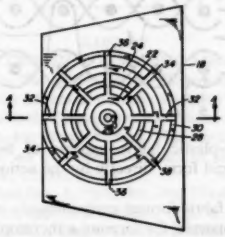
U.S. Cl. 266—233 **10 Claims**



1. A molten metal stirring device for stirring molten metal in a furnace through an opening in the furnace, comprising a stirring tube insertable into the molten metal in the furnace through the opening therein, a tilting mechanism to tilt said stirring tube, a support frame connected to said tilting mechanism, having a support roller to support said stirring tube, and supporting a tail end of said stirring tube at a cantilever support point so that a tip portion of said stirring tube is movable in said molten metal, a positioning mechanism to move said stirring tube relative to said support frame along the axis of said stirring tube so that a dipping position of said stirring tube in said molten metal is adjustable, and a transportable base having supported thereon said support frame, said tilting mechanism, said positioning mechanism, said stirring tube and a suction unit which is coupled to said stirring tube for alternately suck-

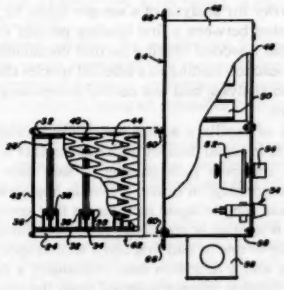
ing molten metal into said stirring tube and blowing molten metal from said stirring tube back into the furnace.

5,160,480
TUNDISH TURBULENCE SUPPRESSOR PAD
Achilles Vassilicos, Pittsburgh, Pa., assignor to USX Corporation, Pittsburgh, Pa.
Filed Jun. 3, 1991, Ser. No. 709,468
Int. Cl.[5] B22D *41/00, 41/02*
U.S. Cl. 266—275 **24 Claims**



1. A metal supply vessel, comprising: a refractory floor and refractory walls for containing molten metal in said supply vessel, a nozzle mounted in said refractory floor for draining molten metal from the vessel, and a refractory pad mounted in the floor of said vessel having a surface for receiving a stream of molten metal thereon, said surface having a plurality of protruding primary ridge portions arranged concentrically about a centerpoint of said surface, said primary ridge portions extending longitudinally in a direction at about a right angle with respect to said centerpoint, at least one of said primary ridge portions extending longitudinally three hundred and sixty degrees around said centerpoint, the height of said primary ridge portions being within a range of from about 6 mm to about 80 mm, the radial spacing between adjacent primary ridge portions as measured between top inner edge surfaces thereof at corresponding radial points thereon being at least 2.0 times the height of the inner of the adjacent primary ridge portions, said primary ridge portions permitting formation of a radial wall jet in the molten metal and dissipating turbulence therein.

5,160,481
OZONE GENERATION APPARATUS
William C. Weaver, 1714 Woodvalley Dr., Carmel, Ind. 46032
Filed Jun. 27, 1991, Ser. No. 721,988
Int. Cl.[5] B01J *19/08*
U.S. Cl. 422—186.07 **16 Claims**



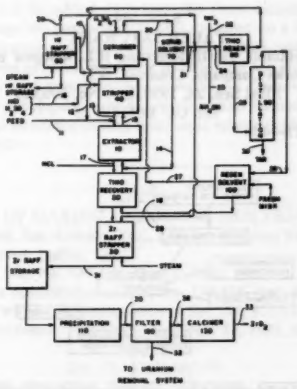
1. An ozone generation apparatus adapted for installation into central air handling system for buildings comprising:

a first housing containing a plurality of ozone generating plates, the first housing having a first pair of opposed walls including openings therein to permit air flow there through adjacent to the plurality of ozone generating plates, a second pair of opposed walls orthogonally situated with respect to the first pair of walls, and including support means for supporting the plurality of ozone generating plates at a fixed location within the housing, the support means including means for electrically contacting selected portions of the ozone generating plates,

a second housing containing circuit means for developing an electrical potential for application to the ozone generating plates, the second housing having a front surface including control means for controlling the circuit means and a back surface adapted to be situated contiguously to an outside surface of an air handling conduit of a central air handling system, the back surface including a perimeteral flange for securing the second housing to the air handling conduit, and

coupling means for selectively coupling the first housing to the back surface of the second housing in at least two different relative orientations to permit adaptation of the ozone generation apparatus to the relative direction of air flow through the air handling conduit, the first housing being confined within a perimeter defined by the perimeteral flange and projecting rearwardly from the back surface of the second housing for projection through an opening in the air handling conduit to a position wholly within the air handling conduit.

5,160,482
ZIRCONIUM-HAFNIUM SEPARATION AND PURIFICATION PROCESS
Kenneth C. Ash, Corvallis; William A. Crocker, Salem; John C. Haygarth, Corvallis; David R. Lee, Lebanon; Donald Morris, Corvallis; John R. Peterson, Salem; Jon A. Riesen, Albany, and Robert S. Yih, Salem, all of Oreg., assignors to Teledyne Industries, Inc., Albany, Oreg.
Filed Mar. 2, 1989, Ser. No. 318,161
Int. Cl.[5] C22B *34/00*
U.S. Cl. 423—75 **29 Claims**



1. A process for the separation and removal from metal ores of inherently present and unwanted hazardous impurities selected from the group consisting of Ra, Th, U and lead which comprises:

halogenating the metal in the ore in a halogenation medium to produce a gaseous halogenated metal-containing product stream and a residue wherein said metal-containing product stream is condensed to separate volatile silicon halogen compounds, from a product stream containing condensed metal halides;

treating said metal halides with acid to produce a solution of soluble salts of said metals;

adjusting in a first stage, the pH of said solution into the range of from about 1 to about 3, to separate certain metal salts by precipitation and in a second stage adjusting the pH of the solution remaining after precipitation to a value of from about 3 to about 7 to precipitate other metal salts;

wherein said residue is further treated by leaching with an acid aqueous solution to solubilize and remove minor amounts of hazardous impurities from the unreacted ore and halogenation medium to produce a leach liquor;

contacting said leach liquor with barium ions and sulfate ions in sufficient concentration to co-precipitate barium and radium ions as an insoluble sulfate complex and lead and other metals as sulfates or hydroxides.

5,160,483

FRAGMENT OF TNF-α FOR PROMOTING WOUND HEALING

Arnold E. Postlethwaite, Eads; Jerome M. Seyer, and Andrew H. Kang, both of Memphis, all of Tenn., assignors to The University of Tennessee Research Corporation, Knoxville, Tenn.

Filed May 7, 1991, Ser. No. 697,642
Int. Cl.[5] A61K *37/00, 45/05*
U.S. Cl. 424—85.1 **10 Claims**

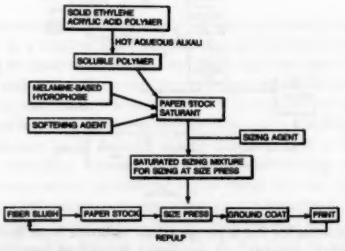
1. A method for promoting the healing of a wound comprising applying to the wound a therapeutically effective dose of a composition consisting essentially of a protein fragment of tumor necrosis factor α (TNF-α) amino acids 31 through 68 SEQ ID No: 1.

5,160,484

PAPER SATURANT

Koyu P. Nikoloff, North Kingston, R.I., assignor to Cranston Print Works Company, Cranston, R.I.

Filed Sep. 28, 1990, Ser. No. 590,029
Int. Cl.[5] B05D *1/18*
U.S. Cl. 427—439 **19 Claims**



14. A method for making saturated paper comprising;

a) providing paper; and

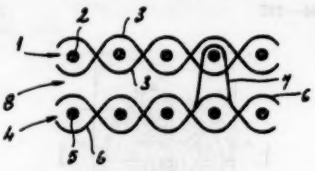
b) saturating the paper with an aqueous mixture comprising ethylene acrylic acid co-polymer, a hydrophobic sizing agent, and at least one softening agent wherein said mixture is in a substantially non-foamed state and the components of said mixture are present in effective saturating amounts.

5,160,485

THERMOPLASTIC FABRIC

Bernard Jaillet, Mery, and Jean-Marc Berthier, Lambesc, both of France, assignors to Hexcel-Genin, Villeurbanne, France

Filed Apr. 9, 1990, Ser. No. 506,194
Claims priority, application France, Apr. 14, 1989, 89 05237
Int. Cl.[5] B32B *3/12*
U.S. Cl. 428—116 **9 Claims**



1. A thermo-plastic fabric capable of being shaped or wrought into rigid form, directly by the action of heat, comprising:

a first woven fabric formed predominantly of fibers of thermoplastic material for forming a thermoplastic matrix;

a second woven fabric superimposed in contacting relationship with the first woven fabric, and formed predominantly of fibers of reinforcing material for reinforcing said thermoplastic matrix once formed;

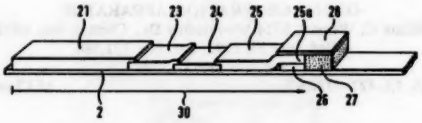
joining means for joining the first and second woven fabrics together at spaced locations.

5,160,486

TEST CARRIER UTILIZING REACTION OF TWO BIOAFFINE BINDING PARTNERS

Reiner Schlipfenbacher, Lampertheim; Dieter Mangold, Maxdorf; Rolf Lerch, Ilvesheim, and Joachim Steinbiss, Lorsch, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Dec. 14, 1989, Ser. No. 450,557
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1988, 3842702
Int. Cl.[5] G01N *21/77*; C12M *1/40*
U.S. Cl. 422—56 **18 Claims**



1. Test carrier for analysis of a sample liquid by means of a binding reaction between a first binding partner contained in the sample and a second binding partner contained in the test carrier, said reaction leading to a labelled species characteristic of the desired analysis, said test carrier comprising

a base layer,

a plurality of capillary action test zones arranged on said base layer in liquid contact with one another so as to form a liquid transport path parallel to said base layer, said zones comprising, in order, a sample application zone to which said sample liquid including a first specific binding partner is applied, a conjugate zone containing a labelled conjugate of one of said first and a second specific binding partners, and a detection zone containing a carrier fixed specific binding partner selected from the group consisting of the other of said first and second specific binding partners and a further specific binding partner which binds with said first specific binding partner, said reaction occurring in one of said conjugate zone and said detection

zone, said labelled species being detected in said detection zone, and

a third specific binding partner which specifically binds with said first binding partner, said third binding partner being contained in one of said conjugate zone and a zone between said sample application zone and said conjugate zone, said third binding partner being so measured that it binds only a part of the first binding partner, thereby acting as a capturing reagent which removes said part from the reaction leading to the characteristic labelled species.

5,160,487

ELECTROPHOTOGRAPHIC MEMBER

Yoshii Morishita; Yasushi Sugimoto; Shigeru Hayashida, all of Hitachi; Hiroko Ishikawa, Katsuta; Yoshiaki Noda, Ichikawa; Shigeru Murakami, Tokyo; Munehiro Sato; Yoshinori Saito, both of Ichikawa; Naoji Kurata, Nishinomiya, and Yoshio Sugita, Chiba, all of Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

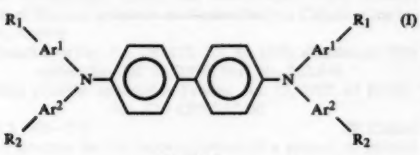
Filed Sep. 4, 1991, Ser. No. 754,657

Claims priority, application Japan, Sep. 4, 1990, 2-233899; Sep. 4, 1990, 2-234031; Sep. 4, 1990, 2-234032

Int. Cl.[5] G03G *5/06, 5/047*

U.S. Cl. 430—59 **14 Claims**

1. An electrophotographic member containing as a charge transport material a fluorine-containing N,N,N',N'-tetraarylbenzidine derivative represented by the formula:



(I)

wherein R_1 and R_2 are independently a hydrogen atom, an alkyl group, an alkoxy group, a fluoroalkyl group or a fluoroalkoxy group, at least one of R_1 and R_2 is a fluoroalkyl group or a fluoroalkoxy group; and Ar^1 and Ar^2 are independently an aryl group which may have one or more substituents other than R_1 and R_2.

5,160,488

BIOREMEDIATION YEAST AND SURFACTANT COMPOSITION

Neil W. Stillman, Mesa, Ariz., assignor to H_2O Chemists, Inc., Gilbert, Ariz.

Filed Sep. 14, 1990, Ser. No. 583,378

Int. Cl.[5] A23L *1/202;* C12N *1/18;* D06M *16/00;* C02F *3/00*

U.S. Cl. 435—262.5 **1 Claim**

1. A chemical product for accelerated biodegradation of petroleum on water consisting of a two component mixture:

a first component being a fermentation component and a second component being an emulsifier component having a surfactant therein;

said fermentation component consisting of about 85–92% by weight water, about 5–9% by weight unrefined sugar, about 1.5% by weight malt and about 0.2% by weight yeast;

said emulsifier component consisting of about 83–88% by weight water, about 2% by weight of a surfactant selected from the group consisting of nonionic ethoxylated secondary alcohol with ethylene oxide and a nonionic ethoxylated linear alcohol with ethylene oxide, about 2–3% sodium borate, 0.1–0.5% by weight citric acid, 0.1–1% by weight lactic acid, about 2% by weight tripolyphosphate and about 1–2% by weight of monosodium glutamate.

5,160,489

EXPRESSION VECTORS AND METHOD FOR THEIR CONSTRUCTION

Tamás Lukácsovich; Pal Venetianer, both of Szeged; Tamás Gaál, Budapest; Imre Boros, and Gabriella Balikó, both of Szeged, all of Hungary, assignors to Richter Gedeon Vegyeszeti Gyar R.T., Budapest, Hungary

PCT No. PCT/HU88/00061, § 371 Date Mar. 16, 1990, § 102(e) Date Mar. 16, 1990, PCT Pub. No. WO89/02466, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 14, 1988, Ser. No. 466,259

Claims priority, application Hungary, Sep. 16, 1987, 4111/87

Int. Cl.[5] C12N *15/00;* C12P *21/06*

U.S. Cl. 435—172.3 **11 Claims**

1. A promoter constructed by joining together promoter P_2 of a ribosomal RNA operon rrn B of *Escherichia coli* and a regulatory sequence of the lac operon of *Escherichia coli* outside the regions −35 and −10, downstream from the region −10, said regulatory sequence having the formula:

AATTGTGAGCGGATAACAATTT-
CACACAGGAAACAGCTATGACC,

and said promoter having a deletion of the TGCA sequence element immediately downstream of the region −10.

5,160,490

THREE-DIMENSIONAL CELL AND TISSUE CULTURE APPARATUS

Gail K. Naughton, and Brian A. Naughton, both of Groton, Vt., assignors to Marrow-Tech Incorporated, La Jolla, Calif.

Division of Ser. No. 402,104, Sep. 1, 1989, Pat. No. 5,032,508, which is a continuation-in-part of Ser. No. 242,096, Sep. 8, 1988, Pat. No. 4,963,489, which is a continuation-in-part of Ser. No. 38,110, Apr. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 36,154, Apr. 3, 1987, Pat. No. 4,721,096, which is a continuation of Ser. No. 853,569, Apr. 18, 1986, abandoned. This application Feb. 21, 1991, Ser. No. 659,220

Int. Cl.[5] C12M *1/00;* C12Q *1/18;* C12N *5/06*

U.S. Cl. 435—284 **19 Claims**

1. A cytological testing apparatus, comprising a three dimensional cell culture positioned in a container to which a test substance can be added, in which the three dimensional cell culture comprises parenchymal cells cultured on a living stromal tissue prepared in vitro comprising stromal cells and connective tissue proteins naturally secreted by the stromal cells attached to and substantially enveloping a framework composed of a biocompatible, non-living material formed to a three dimensional structure having interstitial spaces bridged by the stromal cells.

5,160,491

METHOD OF MAKING A VERTICAL MOS TRANSISTOR

Kiyoshi Mori, San Antonio, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 449,124, Dec. 8, 1989, Pat. No. 5,016,067, which is a continuation of Ser. No. 180,424, Apr. 11, 1988, abandoned, which is a continuation of Ser. No. 921,728, Oct. 21, 1986, abandoned. This application Feb. 19, 1991, Ser. No. 656,522

Int. Cl.[5] H01L *21/70*

U.S. Cl. 437—40 **8 Claims**

1. A method for fabricating an insulated-gate field-effect transistor in a semiconductor substrate, comprising:

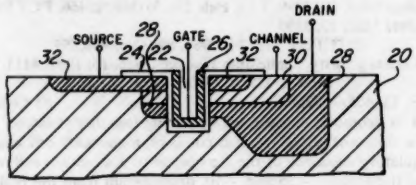
doping a first region of a first conductivity-type along a face of said substrate to a first depth, said substrate being of a second conductivity-type opposite that of said first conductivity type;

doping a second region of said second conductivity into said substrate to a second depth, said second depth being shallower than said first depth;

doping a third region of said first conductivity type into said

substrate to a third depth, said third depth being shallower than said second depth;

etching a trench into said substrate, having walls substantially perpendicular to said face of said substrate, said trench extending through said first, second and third regions to a depth below that of said first depth;



placing a dielectric layer along the walls and bottom of said trench, thereby disposed adjacent said first, second and third regions along a wall of said trench;

placing an electrode covering said dielectric layer so that said electrode is disposed opposite said second region within said trench with said dielectric layer disposed therebetween; and

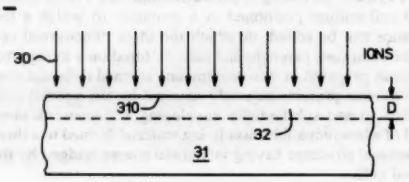
making electrical contact to said first and third regions.

5,160,492

BURIED ISOLATION USING ION IMPLANTATION AND SUBSEQUENT EPITAXIAL GROWTH

Shih-Yuan Wang, Palo Alto, and Michael Renne Ty Tan, Mountain View, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 24, 1989, Ser. No. 342,771
Int. Cl.[5] H01L *21/265*
U.S. Cl. 437—22 **11 Claims**



1. A method of fabricating a semiconductor device, the method comprising:

implanting oxygen ions into a gallium arsenide wafer adjacent a surface thereof;

annealing to activate the ions and thereby form a buried insulating layer adjacent the surface; and

after annealing, epitaxially growing a plurality of semiconductor layers on said surface to form a semiconductor device above the buried insulating layer.

3. A method of fabricating a semiconductor device, the method comprising:

implanting oxygen ions into a gallium arsenide wafer adjacent a surface thereof;

annealing to activate the ions and thereby form a buried insulating layer adjacent the surface;

after annealing, etching a groove through the insulating layer to provide an opening from the surface through the insulating layer to a conductive portion of the wafer; and

epitaxially growing a plurality of semiconductor layers in and over the groove to form a semiconductor device above said insulating layer.

5,160,493

SILICON ENHANCED AMORPHOUS SILICA-ALUMINA

Susan L. Lambert, Rolling Meadows, and Michael W. Schoonover, Arlington Heights, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Apr. 29, 1991, Ser. No. 692,755
Int. Cl.[5] B01J *21/12, 27/12*
U.S. Cl. 502—231 **9 Claims**

1. A silicon enhanced amorphous silica-alumina (SEASAL) composition characterized in that a host amorphous silica-alumina composition has been modified such that from about 3 to about 22 mole percent of the aluminum atoms in the host amorphous silica-alumina have been replaced by silicon atoms and the SEASAL contains from about 0.5 to about 10 weight percent fluoride and has a cracking activity of at least 30%.

4. A silicon enhanced amorphous silica-alumina composition prepared by the process of reacting a host amorphous silica-alumina material with an aqueous solution of a fluorosilicate salt at reaction conditions to replace from about 3 to about 22 mole percent of the aluminum atoms in the host amorphous silica-alumina with silicon atoms and provide a silicon enhanced amorphous silica-alumina composition having from about 0.5 to about 10 weight percent fluoride and a cracking activity of at least 30%.

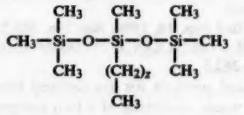
5,160,494

ALKYLMETHYLSILOXANE CONTAINING PERFUME COMPOSITIONS

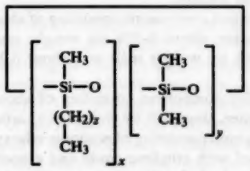
Duane G. Krzysik, and Gary E. LeGrow, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 14, 1992, Ser. No. 868,142
Int. Cl.[5] A61K *7/46*
U.S. Cl. 512—3 **10 Claims**

1. A composition comprising an anhydrous emulsifier-free mixture of a perfume oil and an alkylmethylsiloxane having a formula selected from the group consisting of



and



in which the sum of the integers x and y is four, five or six with the proviso that x and y cannot be zero; and z is an integer having a value of 1–12.

5,160,495

2-CYANO-4,6-DIMITRO-PHENYL MONOAZO DYESTUFFS

Ulrich Bühler, Alzenau; Reinhard Kühn, Frankfurt, and Margareta Boos, Hattersheim, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

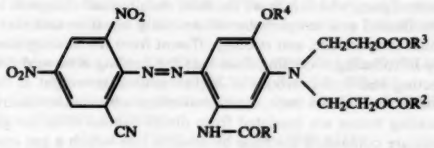
Continuation of Ser. No. 438,316, Nov. 20, 1989, abandoned. This application Oct. 29, 1990, Ser. No. 605,148

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1988, 3840065

Int. Cl.[5] C09B *29/085, 67/22;* D06P *1/18*

U.S. Cl. 534—854 **10 Claims**

1. Monoazo dyestuff of the formula



wherein R^1 denotes alkyl having 1 to 3 carbon atoms; R^2 and R^3, independently of one another, each denote alkyl having 2 to 5 carbon atoms; and R^4 denotes methyl or ethyl.

5,160,496

HYDROXYLATION OF PHENOLS/PHENOL ETHERS

Michel Constantini, Lyons, and Jean-Michel Popa, Drancy, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

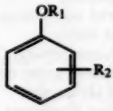
Continuation of Ser. No. 220,175, Jul. 18, 1988, abandoned. This application Jul. 16, 1990, Ser. No. 552,840

Claims priority, application France, Jul. 17, 1987, 87 10420

Int. Cl.[5] C07C *37/60*

U.S. Cl. 568—771 **20 Claims**

1. A process for the hydroxylation of a phenol or phenol ether having the general formula (I):



(I)

in which R_1 is a hydrogen atom, a methyl group, an ethyl group or a phenyl group, and R_2 is a hydrogen atom, an alkyl radical containing 1 to 4 carbon atoms, an alkoxy radical containing 1 to 4 carbon atoms, or a phenyl or cyclohexyl radical, comprising conducting said hydroxylation with hydrogen peroxide, in the presence of a catalytically effective amount of at least one bridged clay.

5,160,497

PHENOL PRODUCTION PROCESS

Bernard A. Juguin, Rueil Malmaison; Jean-Paul Boitiaux, and Germain J. Martino, both of Poissy, all of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Filed Dec. 19, 1990, Ser. No. 629,911

Claims priority, application France, Dec. 21, 1989, 89 17162

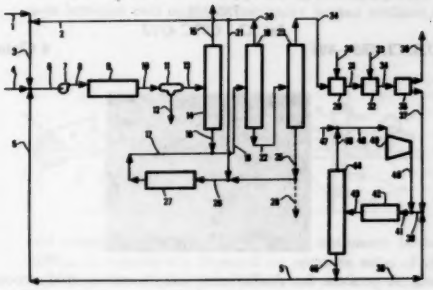
Int. Cl.[5] C07C *37/14, 37/16*

U.S. Cl. 568—798 **19 Claims**

1. A process for producing phenol, comprising the following successive steps:

(1) benzene is reacted in an alkylation step with a feedstock comprising propene and isopropyl alcohol by contacting at least one catalyst based on a dealuminzed Y zeolite with an SiO_2/Al_2O_3 molar ratio ranging from 8 to 70 at a temperature of from about 100°–350° C. under a pressure of from 1–10 mPa, then the obtained product is fractionated in order to separately collect a first fraction comprising non-converted benzene, a second fraction comprising cumene and a third fraction comprising at least one polyisopropylbenzene,

(2) at least part of said third fraction in a transalkylation step separate from said alkylation step is reacted with benzene by contacting at least one catalyst based on a dealuminized Y zeolite with an SiO_2/Al_2O_3 molar ratio ranging from 8 to 70 at a temperature of from about 250°–500° C. under a pressure of from 2–10 mPa, and cumene is collected,



(3) the cumene coming from steps (1) and (2) is oxidized with air to obtain cumyl hydroperoxide, said hydroperoxide is cleaved with an acid to obtain a mixture of phenol and acetone, then said mixture is fractionated in order to separately collect phenol and acetone,

(4) the acetone obtained at the end of step (3) is at least partly hydrogenized at a temperature of from about 40°–200° C. under a pressure of from 1.5–10 mPa into isopropyl alcohol that is then at least partly recycled directly to step (1).

5,160,498

PROCESS FOR THE PREPARATION OF CYCLOHEXANOL DERIVATIVES

Robert M. Weinstein, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 602,040, Oct. 22, 1990, Pat. No. 5,107,038. This application Dec. 20, 1991, Ser. No. 797,565

Claims priority, application Switzerland, Nov. 13, 1989, 4072/89

Int. Cl.[5] C07C *35/08, 29/19*

U.S. Cl. 568—834 **9 Claims**

1. A process for the preparation of 4-tert-butyl-cyclohexanol, predominantly in the form of its cis isomer, which comprises hydrogenating 4-tert-butyl-phenol in the presence of a catalytic system composed of rhodium on a Al_2O_3, SiO_2, TiO_2, SiO_2, Al_2O_3 or charcoal support, in combination with HBF_4 or BF_3 n wherein Y designates a R_2O group, R being a C_1 to C_6 lower alkyl radical, or a CH_3CO_2H, H_3PO_4 or H_2O group and index n is equal to zero, 1 or 2, at a temperature of between 25° and 200° C. and a pressure of between 3×10^5 and 2×10^6 Pa.

5,160,499

PURIFICATION OF 1,1,1,2-TETRAFLUOROETHANE

Derek W. Edwards, Runcorn, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Mar. 11, 1992, Ser. No. 849,350

Claims priority, application United Kingdom, Mar. 14, 1991, 9105421

Int. Cl.[5] C07C *17/38*

U.S. Cl. 570—179 **11 Claims**

1. A process for the removal of 1-chloro-2,2-difluoroethylene from 1,1,1,2-tetrafluoroethane which process comprises

contacting 1,1,1,2-tetrafluoroethane containing 1-chloro-2,2-difluoroethylene with a zeolite containing strontium cations.

5,160,500

ZEOLITE SYNTHESIS USING AN ALCOHOL OR LIKE MOLECULES

Pochen Chu, Voorhees; Donald J. Klocke, Somerdale; David O. Marler, Deptford; John P. McWilliams, Woodbury, all of N.J., and James C. Vartuli, West Chester, Pa., assignors to Mobil Oil Corporation, Fairfax, Va.

Division of Ser. No. 91,612, Aug. 31, 1987, Pat. No. 5,063,038, which is a continuation-in-part of Ser. No. 789,609, Oct. 21, 1985, abandoned. This application Oct. 30, 1991, Ser. No. 785,361

Int. Cl.[5] C07C *4/12*

U.S. Cl. 585—486 **4 Claims**

1. A process for dealkylating ethylbenzene, said process comprising contacting said ethylbenzene under sufficient dealkylating conditions with a catalyst prepared in accordance with a method comprising the steps of:

(i) preparing an aqueous reaction ZSM-23 zeolite, said reaction mixture comprising water, a source of silica, a source of alumina and a mixed organic directing agent comprising (a) an amine which is pyrrolidine and (b) ethylene glycol;

(ii) maintaining said reaction mixture at a sufficient temperature to crystallize said ZSM-23;

(iii) recovering said ZSM-23;

(iv) combining said ZSM-23 with an alumina binder;

(v) calcining said alumina bound ZSM-23 under conditions sufficient to decompose said pyrrolidine;

(vi) exchanging cations in said ZSM-23 with ammonium ions; and

(vii) calcining said ammonium exchanged catalyst under conditions sufficient to decompose ammonium ions, wherein said sources of silica and alumina in step (i) are prepared by the steps of:

(a) forming an aqueous gel by combining sodium silicate, aluminum sulfate and water;

(b) adding ZSM-23 seeds to this gel;

(c) washing and filtering the solids from said gel of step (b) to remove sodium therefrom;

(d) spray drying said washed and filtered solids of step (c);

(e) exchanging cations in said spray dried solids with ammonium ions; and

(f) calcining said ammonium exchanged spray dried solids under conditions sufficient to decompose said ammonium ions.

5,160,501

METHOD FOR THERMAL CONVERSION OF METHANE AND REACTOR FOR CARRYING OUT THE METHOD

Jacques Alagy, Charbonnieres; Paul Broutin, Ecully; Christian Busson, Charbonnieres, and Jerome Weill, Lyons, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed May 16, 1991, Ser. No. 700,706

Claims priority, application France, May 17, 1990, 90 06294

Int. Cl.[5] C07C *2/00*

U.S. Cl. 585—500 **14 Claims**

1. In a method of thermal conversion of methane to hydrocarbons of higher molecular weight in an elongated reaction zone, comprising a heating zone and a cooling zone following said heating zone, said method comprising circulating a charge comprising a gas mixture containing methane in the heating zone in a direction of flow substantially parallel to the axis of the elongated reaction zone, said heating zone comprising a plurality of electric heating means arranged in substantially parallel sheets which form a bundle of triangular, square or rectangular pitch in transverse elevation, said heating means being grouped in successive cross sections substantially normal to the direction of the reaction zone, the sections being independent of one another and supplied with electricity so as to establish at least two parts in the heating zone, the first part enabling the charge to be brought to a maximum temperature of above about 750° C. to no more than about 1500° C. and the second part, which follows the first, enabling the charge to be maintained at a temperature substantially equal to said maximum temperature, and cooling effluent from the heating zone by introducing a cooling fluid into the cooling zone and collecting said hydrocarbons of higher molecular weight at the end of the reaction zone, the improvement wherein the electric heating means are insulated from direct contact with the gas mixture containing methane by sheaths into which a gas containing hydrogen is fed, said sheaths having sufficient permeability and said gas fed into said sheaths being at a sufficient pressure, such that at least part of the hydrogen is diffused from the inside of said sheaths to at least selected locations on the outside of said sheaths.

5,160,502

COMPOSITION OF MATTER AND METHOD OF OXIDATIVE CONVERSION OF ORGANIC COMPOUNDS THEREWITH

James B. Kimble, Bartlesville, and John H. Kolts, Ochelata, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 22, 1986, Ser. No. 945,123

Int. Cl.[5] C07C *2/00*

U.S. Cl. 585—500 **27 Claims**

1. A method for the oxidative conversion of methane to higher hydrocarbons comprising:

contacting a feed material comprising methane and a free oxygen-containing gas with

a solid contact material, comprising: (1) cobalt, (2) at least one metal selected from the group consisting of Group IA metals, (3) silicon and (4) oxygen,

under conditions sufficient to convert said methane to said higher hydrocarbons.

5,160,503

WATER-SOLUBLE BLENDS OF ACTIVE METHYLENE COMPOUNDS AND POLYHYDRIC ALCOHOLS AS FORMALDEHYDE SCAVENGERS

Richard D. Smith, Opelika, Ala., assignor to West Point Pepperell, West Point, Ga.

Filed Nov. 13, 1989, Ser. No. 436,142

Int. Cl.[5] B27N *3/02*; C09K *3/00*; D06M *13/382, 13/417, 23/04*

U.S. Cl. 8—115.7 **35 Claims**

1. A composition for a formaldehyde scavenger consisting of a water-soluble blend of a substituted or unsubstituted polyhydric alcohol and an active methylene compound selected from the group consisting of dialkylmalonate and alkylacetoacetate.

8. A method of reducing the amount of formaldehyde released from a fabric composed either entirely or in part of cellulosic fibers, wherein said fabric is treated with a durable press finishing composition comprising a water-soluble blend of a substituted or unsubstituted polyhydric alcohol and an active methylene compound selected from the group consisting of dialkyl malonate and alkylaceetoacetate.

32. A method of manufacturing particleboard which comprises mixing a wood material with a urea-formaldehyde resin

and curing by heating the resin and reducing the amount of formaldehyde released from the particleboard by adding a scavenger to the urea-formaldehyde resin;

the improvement wherein the scavenger is a water-soluble blend of a substituted or unsubstituted polyhydric alcohol and an active methylene compound selected from the group consisting of dialkyl malonate and alkylacetoacetate.

5,160,504

METHOD OF DYEING LEATHER WITH METAL COMPLEX DYES COMPRISED OF METALIZABLE AZO COMPOUNDS

Takashi Ono, Takatsuki; Tatsuya Yagyu, Yahata; Katsumi Fukuda, Osaka, and Minako Terasaki, Moriguchi, all of Japan, assignors to Orient Chemical Industries, Ltd., Osaka, Japan

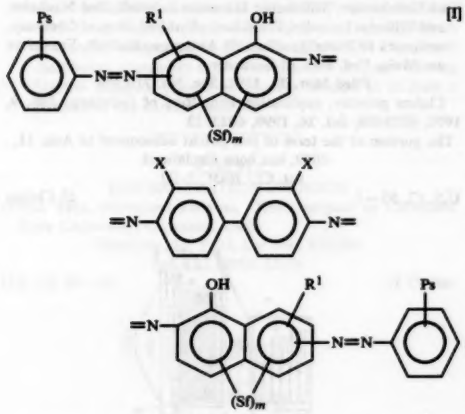
Division of Ser. No. 537,904, Jun. 12, 1990, Pat. No. 5,095,100. This application Oct. 28, 1991, Ser. No. 783,414

Claims priority, application Japan, Jun. 13, 1989, 1-151421; Jun. 19, 1989, 1-156404

Int. Cl.[5] D06P *3/32, 5/00;* **C09B** *45/24*

U.S. Cl. 8—436 **8 Claims**

1. A metal-tanned leather dyeing method comprising dyeing metal-tanned leather using a metal complex dye comprising a metalizable polyazo compound represented by Formula:



[I]

wherein Ps is a phosphono group in the form of the free acid or a salt thereof; Sf is a sulfo group in the form of the free acid or a salt thereof; m is 0, 1 or 2; X is hydroxyl, alkoxy having a carbon number of 1 or 2 or carboxyl; and R^1 is hydrogen or amino.

5,160,505

METHOD AND APPARATUS FOR TRANSFER PRINTING OF SYNTHETIC FABRICS

Pierre L. P. M. Seveno, 61 Place Ladouceur, Repentigny, Quebec, Canada J6A 6C7 , and Aime M. Lemire, St. Laurent, Canada, assignors to Pierre L. P. M. Seveno, Repentigny, Canada

Filed Aug. 3, 1990, Ser. No. 562,559

Claims priority, application Canada, Aug. 23, 1989, 609204

Int. Cl.[5] D06P *5/00*

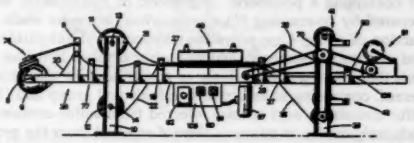
U.S. Cl. 8—471 **3 Claims**

1. A continuous method for the transfer printing of a web of synthetic fabric, said method comprising the steps of:

a) providing a multi-layered web of indefinite length from a supply station, said multi-layered web including a web of synthetic fabric to be printed and further including a first transfer print carrier web and a second transfer print carrier web, the first and second carrier webs each having a surface which carries a sublimable dye, said first and second carrier webs being disposed in intimate frictional contract with opposite surfaces of said web of fabric so that said surfaces carrying said sublimable dye are repectively in contact with the surfaces of the web of fabric to be printed;

b) conveying said multi-layered web from said supply station to a printing station by applying tension to said first and second carrier webs greater than that applied to said web of fabric;

c) subjecting said multi-layered web in said printing staton to heat and slight pressure by conveying said multi-layered web between two opposed stationary heated surfaces of



said printing station, such that each stationary heated surface is respectively disposed on opposite sides of the multi-layered web, said first and second carrier webs each respectively being in contact against said two opposed stationary heated surfaces while said web is being conveyed therebetween to thereby effect the sublimation of the sublimable dye from each of said carrier webs and the transfer of said dye onto both surfaces of the web of fabric simultaneously, said contact being for a time sufficient to cause said sublimation and transfer;

d) separating said web of fabric from said first and second carrier webs; and

e) collecting said web of fabric and said carrier webs following the separation thereof at a receiving station.

5,160,506

LIQUID FUEL MIXTURE, METHOD FOR ITS PRODUCTION, AND IS USE FOR TWO-STROKE ENGINES

Hans Schur, Weidenstrasse 2, 7432 Bad Urach; Werner Angerer, Keltenstrasse 21, 8029 Sauerlach, and Friedrich Sprügel, Solalindenstrasse 36b, 8000 München 82, all of Fed. Rep. of Germany

Filed Jul. 13, 1990, Ser. No. 552,041

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1989, 3924583

Int. Cl.[5] C10L *1/18*

U.S. Cl. 44—308 **24 Claims**

1. A liquid fuel mixture, comprising a C_3, a C_4-alkane or a mixture of C_3 and C_4-alkanes, and at least one non-fragrant oil component selected from the group consisting of the biologically decomposable synthetic oils, vegetable oils and animal oils, with the weight ratio of oil component: alkane lying within the range of 1:20 to 1:250.

5,160,507

MULTIFUNCTIONAL ESTER-TYPE ADDITIVES FOR LIQUID HYDROCARBYL OR HYDROCARBYLOXY FUEL

Andrew G. Horodysky, Cherry Hill, N.J., assignor to Mobil Oil Corp., Fairfax, Va.

Filed Jun. 4, 1990, Ser. No. 532,727

The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.

Int. Cl.[5] C10L *1/18, 1/22*

U.S. Cl. 44—390 **16 Claims**

1. A composition comprising a liquid hydrocarbyl or hy-

drocarbyloxy fuel and a minor dispersant/detergent and/or antioxidant amount of an additive consisting of a polymeric, oligomeric or hydrocarbyl ester containing integral sulfur-ester moieties prepared by reacting (1) a polycarboxylate ester made by the reaction of a C_{20} to about a C_{200} alkenyl succinic anhydride or acid and a polyol having from about 6 to about 30 carbon atoms and from about 3 to about 6 hydroxyl groups said ester containing at least one free hydroxyl group and having at least 30 carbon atoms and (2) a sulfur-containing acid or acid generating species selected from the group consisting of thiodipropionic acid, dithiopropionic acid, thiodibutanoic acid, anhydrides thereof or mixtures thereof in an ester to sulfur species molar ratio of from about 1:1 to about 1:0.001 at temperatures of from about 80° to about 200° C.

8. A composition comprising a major amount of a liquid hydrocarbyl or hydrocarbyloxy fuel and a minor dispersant/detergent and/or antioxidant amount of an additive product containing a polymeric, oligomeric or hydrocarbyl ester prepared by co-reacting (1) a polycarboxylate ester made by reaction of a C_{20}–C_{200} polyalkenylhydrocarbyl anhydride or acid thereof, oligomeric alkenylhydrocarbyl anhydrides or acids thereof, oligomeric, dimer or trimer acids or anhydrides thereof, containing at least one free hydroxyl group and (2) a sulfur containing acid species selected from sulfur-containing acids, anhydrides or mixtures thereof selected from the group consisting of thiodipropionic acid, dithiopropionic acid, thiodibutanoic acid and anhydrides thereof and thereafter reacting the product of (1) and (2) with (3) a polyol having from 6 to about 30 carbon atoms and from about 3 to 6 hydroxyl groups.

5,160,508

SELF-REINFORCED SILICON NITRIDE CERAMIC OF HIGH FRACTURE TOUGHNESS

Aleksander J. Pyzik; Harold E. Rossow; Douglas B. Schwarz; Donald R. Beaman; Barbara M. Pyzik, all of Midland, and William J. Dubensky, Traverse City, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 572,823, Aug. 24, 1990, which is a continuation-in-part of Ser. No. 398,801, Aug. 25, 1989, Pat. No. 5,021,372, which is a continuation-in-part of Ser. No. 297,627, Jan. 13, 1989, abandoned, which is a continuation-in-part of Ser. No. 148,748, Jan. 27, 1988, Pat. No. 4,883,776. This application Jan. 24, 1992, Ser. No. 826,315

The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.

Int. Cl.[5] C09B *35/58*

U.S. Cl. 51—307 **19 Claims**

1. A silicon nitride ceramic body having a fracture toughness greater than about 6 MPa $(m)^{\frac{1}{2}}$, as measured by the Chevron notch technique at about 23° C., comprising:

(a) a crystalline phase of β-silicon nitride of which at least about 20 volume percent, as measured by viewing one plane of the silicon nitride ceramic body by scanning electron photomicrographs, is in the form of whiskers having an average aspect ratio of at least about 2.5; and

(b) a glassy phase in an amount not greater than about 35 weight percent of the total weight comprising a densification aid, a conversion aid, silica, and a beta-silicon nitride whisker growth enhancing compound, the densification aid is a non-oxide derivative of magnesium or a source of an element selected from the group consisting of beryllium, calcium, strontium, barium, radium, lithium, sodium, potassium, rubidium, cesium, silicon, hafnium, tantalum, indium, galium, zinc, titanium and francium, the conversion aid is a non-oxide derivative of yttrium or a source of an element selected from the group consisting of scandium, actinium, lanthanum, lithium, sodium, potassium, rubidium, cesium and francium, and the compound is a non-oxide derivative of calcium, a derivative of an element selected from the group consisting of sodium, potassium, scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, strontium, zirconium, niobium, barium, and lanthanum, or an oxide of an element selected from the group consisting of gallium, indium, hafnium, tantalum and boron, the densification aid, the conversion aid and the whisker growth enhancing compound being derived from three different elements.

5,160,509

SELF-BONDED CERAMIC ABRASIVE WHEELS

Lee A. Carman, Worcester, Mass.; William S. Coblenz, Arlington, Va., and Janet L. Hammarstrom, Auburn, Mass., assignors to Norton Company, Worcester, Mass.

Filed May 22, 1991, Ser. No. 704,162

Int. Cl.[5] B24D *5/00*

U.S. Cl. 51—307 **6 Claims**

6. A grinding wheel having a self-bonded, microcrystalline alpha alumina structure with a volume percent of voids of from about 40 to about 50%.

5,160,510

PROCESS AND APPARATUS FOR PURIFYING DUST- AND POLLUTANT-CONTAINING EXHAUST GASES

Karl Steinbacher, Mühlheim; Hermann Schmidt, Bad Nauheim, and Wilhelm Leussler, Frankfurt, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

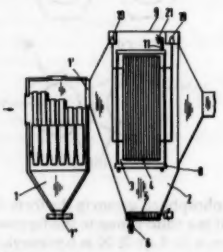
Filed Mar. 31, 1991, Ser. No. 710,354

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1990, 4018488; Jul. 26, 1990, 4023723

The portion of the term of this patent subsequent to Aug. 11, 2009, has been disclaimed.

Int. Cl.[5] B03C *3/00*

U.S. Cl. 55—7 **25 Claims**



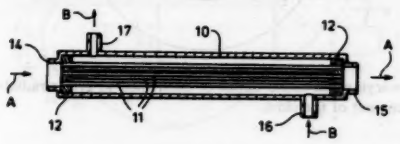
1. A process of purifying dust- and pollutant-containing exhaust gases, comprising the steps of first subjecting an exhaust gas in a first stage to a dry purification in a centrifugal separator after subjecting the exhaust gas to said dry purification in said first stage, subjecting the exhaust gas in a second stage to an electrostatic purification in an electrostatic precipitator and passing the exhaust gas in the second stage through at least one of a plurality of fields of said electrostatic precipitator, said fields of said electrostatic precipitator being provided with a plurality of liquid-wetted collecting electrodes, said liquid-wetted collecting electrodes defining a plurality of gas passages through which said exhaust gas can pass; and supplying a liquid in the second stage to top ends of the liquid-wetted collecting electrodes; collecting the liquid directly under bottom ends of the liquid-wetted collecting electrodes to form a collected liquid; discharging the collected liquid from the precipitator laterally; separating a dry dust in the second stage; and supplying the dry dust separated in the second stage to a dust-collecting device.

5,160,511

WATER-VAPOUR PERMEABLE MATERIAL

James E. Lovelock, Launceston, Great Britain, assignor to Hewlett-Packard Company, Palo Alto, Calif.

PCT No. PCT/GB88/00736, § 371 Date Jun. 19, 1989, § 102(e) Date Jun. 19, 1989, PCT Pub. No. WO89/02447, PCT Pub. Date Mar. 23, 1989
PCT Filed Sep. 7, 1988, Ser. No. 359,661
Claims priority, application United Kingdom, Sep. 10, 1987, 8721266; Nov. 4, 1987, 8725879
Int. Cl.[5] B01D *53/22, 63/02*
U.S. Cl. 55—16 19 Claims



1. In a method of removing water vapour from a wet gas comprising:

(1) passing the wet gas along one surface of a water-vapour permeable membrane, and

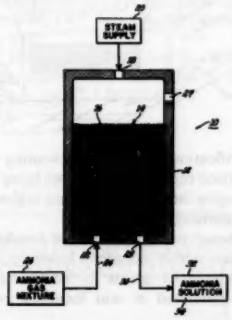
(2) passing a drying agent along the opposite surface of said water-permeable membrane, the improvement wherein said water-vapour permeable membrane is adapted to operate at temperatures of up to about 100° C., which membrane comprises a perfluorocarbon polymer having lithium sulphate groups covalently bonded to at least a portion of the carbon skeleton.

5,160,512

GAS SEPARATION PROCESS

Orhan Talu, Richmond Heights, Ohio, assignor to Cleveland State University, Cleveland, Ohio

Filed Jan. 13, 1992, Ser. No. 819,991
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—28 11 Claims



1. A method to more effectively remove ammonia from a flowing waste gas stream comprising the steps of:

(a) activating a bed of adsorbent particles with steam to form a surface deposit of condensed steam on the adsorbent particles,

(b) contacting the activated adsorbent bed with the flowing waste gas stream,

(c) absorbing a portion of the ammonia in the condensed steam deposit, and

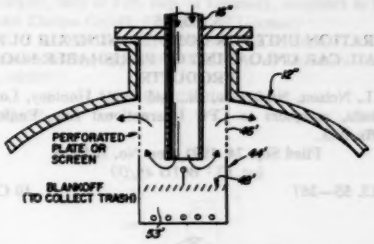
(d) adsorbing a further portion of the ammonia in the adsorbent particles to provide increased sorption capacity during removal.

5,160,513

INLET STREAM DEBRIS COLLECTION METHOD AND APPARATUS

William J. Koves, Hoffman Estates, Ill., assignor to UOP, Des Plaines, Ill.

Filed Nov. 13, 1991, Ser. No. 790,910
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—74 11 Claims



1. A method of contacting a fluid stream containing solid or liquid debris with a bed of particulate material in a downflow contacting vessel, said process comprising:

(a) passing said fluid stream into an inlet of a contacting vessel and into a fluid distributor;

(b) discharging said fluid stream downwardly into said distributor and directing said fluid stream toward a fluid deflector baffle located in and above the bottom of said distributor;

(c) impacting said fluid stream against said deflector baffle and collecting the debris in the bottom of said distributor below said baffle;

(d) discharging a fluid stream having a reduced concentration of debris from said distributor through perforations located in the sides of said distributor above said baffle;

(e) passing said fluid stream having a reduced concentration of debris into contact with a bed of particulate material; and,

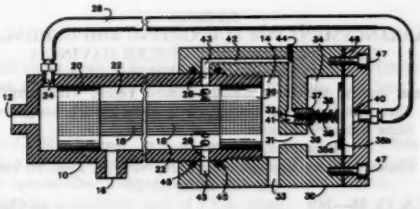
(f) withdrawing the fluid stream from said bed of particulate material and from said contacting vessel.

5,160,514

SWEEP VALVE FOR DEHYDRATION VALVE

David D. Newbold, and Raymond H. Colton, both of Bend, Oreg., assignors to Bend Research, Inc., Bend, Oreg.

Filed Dec. 12, 1991, Ser. No. 806,718
Int. Cl.[5] B01D *53/22, 63/02, 71/60*
U.S. Cl. 55—158 3 Claims



1. In combination with a gas dehydration module containing a multiplicity of hollow fiber membranes in a chamber having respective feed and product ends and a permeate port, wherein the lumens of said hollow fiber membranes are in fluid communication with a feed gas containing water vapor and the outside of said hollow fiber membranes are in fluid communication with said permeate port, a gas recycling valve comprising valve means having a variable restriction, communicating

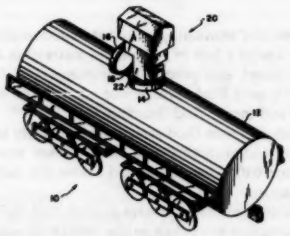
between the product end of said chamber and the outside of said hollow fiber membranes and having a flow connection to said feed gas and automatically responsive to change in the feed gas flow rate through the lumens of said hollow fiber membranes, for urging said restriction toward opening in response to increases in said flow rate, and for urging said restriction toward closing in response to decreases in said flow rate.

5,160,515

ASPIRATION UNIT FOR CONDITIONING AIR DURING RAIL CAR UNLOADING OF PERISHABLE FOOD PRODUCTS

John L. Nelson, Naperville, Ill., and David Houldey, London, Canada, assignors to CPC International Inc., Englewood Cliffs, N.J.

Filed Sep. 24, 1991, Ser. No. 764,539
Int. Cl.[5] B01D *46/00*
U.S. Cl. 55—267 **10 Claims**



1. Rail tank car unloading aspiration unit for conditioning air received within the headspace inside a rail tank car during removal of the contents of the rail tank car and replacement of the removed contents with conditioned air, the unit comprising an air transfer housing portion configured and dimensioned to be received within an access port in the roof of a rail tank car, and including inlet conduit means for directing conditioned air into the headspace and outlet conduit means for removing air from the headspace; cover means for covering the unit; an intake means for admitting ambient air into the unit; conditioning means between said cover means and said air transfer portion for conditioning the ambient air by heating the air to a temperature within a predetermined range and exposing the air to electromagnetic radiation; and air movement means for drawing ambient air through said air intake means and expelling the conditioned air through said inlet conduit means after passage of the ambient air through said conditioning means.

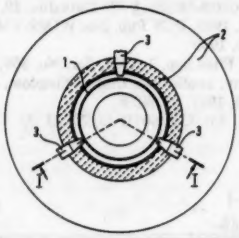
5,160,516

ARRANGEMENT FOR SUPPORTING AND GUIDING A CYCLONE SKIRT IN A BOILER HAVING A CIRCULATING FLUIDIZED BED

Jean Aubry, Plessis Robinson; André Teton, Villemeux sur Eure, and Jean-Paul Tessier, Paris, all of France, assignors to Stein Industrie, France

Filed Nov. 26, 1991, Ser. No. 797,981
Claims priority, application France, Nov. 27, 1990, 90 14807
Int. Cl.[5] B01D *53/12*
U.S. Cl. 55—269 **10 Claims**

1. An arrangement for supporting and guiding a unitary skirt of a cylindrical cyclone body of a boiler having a circulating fluidized bed, said arrangement comprising at least three metal shoes mounted on said body and passing radially through the cyclone body, which shoes are evenly distributed around the periphery of the cyclone body in a horizontal plane, and said shoes having inner ends supporting the top portion of the skirt by means of a first, horizontal annular flange provided on the skirt, extending completely about the outer periphery of said skirt and bearing solely vertically against the shoes, and means



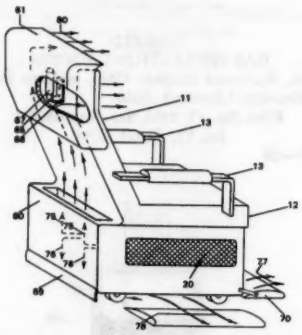
for varying the radial depth of each shoe to effect radial displacement of the skirt.

5,160,517

SYSTEM FOR PURIFYING AIR IN A ROOM

Richard E. Hicks, 108 Devonshire Rd., Waban, Mass. 02168, and Richard R. Fenner, 20 Willage Dr., Walpole, Mass. 02081

Continuation of Ser. No. 616,664, Nov. 21, 1990, abandoned.
This application Feb. 20, 1992, Ser. No. 841,191
Int. Cl.[5] B01D *46/00*
U.S. Cl. 55—385.1 **7 Claims**



1. An air-purification system for preventing pollutants generated at a localized region of space from being dispersed from said localized region into the surrounding regions of said space, said system comprising:

a structure being positioned in said localized region and having a base which includes a housing;

said base having inlet means for admitting air containing pollutants generated at said localized region into said housing;

air purification means contained within said housing and comprising one or more filters and a blower means for circulating said air containing pollutants through said one or more filters;

said base having outlet means for distributing the air flowing from said one or more filters into two or more separate filtered air streams and;

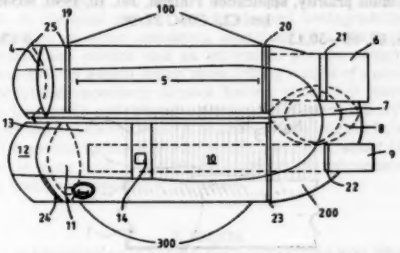
means for causing said filtered air streams to be directed so as to provide controlled amounts of air flowing in each of said two or more separate filtered air streams for drawing pollutants in the air from said localized region toward said inlet means.

5,160,518

SECOND CHANCE SECONDARY SMOKE TRAP

Joseph G. Vega, Jr., 6237 Rockwell St., Oakland, Calif. 94618

Filed Jun. 3, 1991, Ser. No. 709,642
Int. Cl.[5] A24F *19/10*; B01D *46/44*
U.S. Cl. 55—385.8 **2 Claims**



1. A smoke containing, directing, and filtering device, comprising:

a) an air tight cylindrically U-shaped tube having means for assembling and disassembling said U-shaped tube;

b) a combustion chamber tube disposed in said air tight cylindrically U-shaped tube having a one-way inhalation valve and having an end, means for supporting a smoking medium in said combustion chamber tube;

c) a fan unit disposed in said air tight cylindrically U-shaped tube, said fan unit driving fresh air into said end of said combustion chamber tube; and

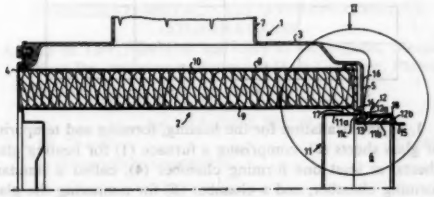
d) a filtration chamber tube in said U-shaped tube having a one way exhalation valve so that one can inhale smoke via said one way inhalation valve and can exhale smoke into said filtration chamber tube via said one way exhalation valve prior to allowing smoke into the environment.

5,160,519

INTAKE AIR FILTER FOR AN INTERNAL COMBUSTION ENGINE

Per Svensson, and Sten Klippare, both of Göteborg, Sweden, assignors to AB Volvo, Goteborg, Sweden

PCT No. PCT/SE90/00479, § 371 Date Feb. 11, 1992, § 102(e) Date Feb. 11, 1992, PCT Pub. No. WO91/00423, PCT Pub. Date Jan. 10, 1991
PCT Filed Jul. 4, 1990, Ser. No. 778,198
Claims priority, application Sweden, Jul. 5, 1989, 8902440
Int. Cl.[5] B01D *46/00*
U.S. Cl. 55—482 **8 Claims**



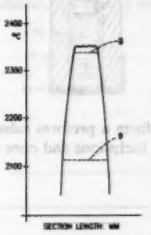
1. Filter device for filtering a gaseous medium, comprising a filter housing with an inlet opening and an outlet opening for the medium, a filter element enclosed in the housing and disposed between said openings, and a pipe stub coupled to the outlet opening of the housing for coupling to a gas conduit, said pipe stub extending through the outlet opening and having a portion extending into the interior of the housing with a surface which can form a sealing surface against a seal on the filter element, characterized in that an elastic angular element (12) is placed between the edge (14) of the outlet opening and the outer surface of the pipe stub (11) and extends axially out over the pipe stub to form a seal between the pipe stub and a gas conduit (15) coupled thereto.

5,160,520

PROCESS FOR THE PRODUCTION OF A BLANK MOLD FOR GLASS FIBER OPTICAL WAVEGUIDES

Norbert Keim, Bietigheim-Bissingen, and Manfred Wittmann, Stuttgart, both of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Fed. Rep. of Germany

Filed Jun. 21, 1991, Ser. No. 718,626
Claims priority, application Fed. Rep. of Germany, Jun. 23, 1990, 4020101
Int. Cl.[5] C03B *37/025*
U.S. Cl. 65—2 **11 Claims**



1. A process for the production of a blank mold for glass fiber optical waveguides with a core and a single-or multiple-layer sheath, in which the core glass material is applied to the inner wall of a glass tube by chemical deposition from the vapor phase, the internally-coated glass tube is caused to collapse by temperature treatment, and this blank mold is finally drawn out to a glass fiber, said process comprising the steps of:

providing heating means adjacent the glass tube for carrying out a temperature treatment for collapse of the glass tube, the heating means providing a temperature profile in a section of the glass tube being treated that is determined by an upper region of maximum glass temperature and a lower region at glass softening temperature, in which the upper region of maximum glass temperature shows a largely uniform temperature level with a width along the section of the glass tube that is approximately equal to a width of the lower region at the glass softening temperature; and

carrying out the temperature treatment for collapse of a length of the glass tube by providing relative movement between the heating means and the glass tube along the length of the glass tube.

5,160,521

METHOD FOR MAKING OPTICAL FIBER PREFORMS

Danh C. Tran, 20 Royal Dominion Ct., Bethesda, Md. 20817

Filed Jun. 21, 1991, Ser. No. 718,705
Int. Cl.[5] C03C *25/02*
U.S. Cl. 65—3.11 **11 Claims**

1. A method of making an optical fiber preform convertible into optical fiber, comprising:

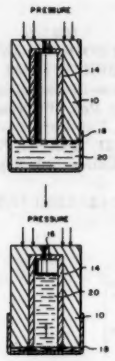
forming a cladding shell of a first glass;

forming a viscous glass mass of a second glass compatible as a waveguide core with said first glass and having an index of refraction greater than said first glass, said viscous glass mass of said second glass being at approximately its glass softening temperature;

providing said cladding shell at about its glass transition temperature;

forcing said viscous glass mass of said glass under pressure

and at approximately its glass softening temperature into said cladding shell at about its glass transition temperature



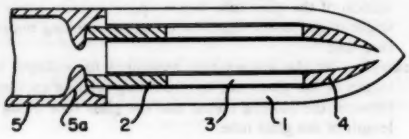
and cooling to form a preform substantially free of bubbles, crystalline inclusions and core crystals.

5,160,522

METHOD FOR PRODUCING PREFORM FOR POLARIZATION RETAINING OPTICAL FIBER

Masahiro Takagi; Hiroshi Suganuma, and Hiroo Kanamori, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Aug. 6, 1991, Ser. No. 241,043
Claims priority, application Japan, Aug. 9, 1990, 2-212303; Aug. 9, 1990, 2-212304
Int. Cl.[5] C03B *37/012*
U.S. Cl. 65—3.11 **3 Claims**



1. A method for producing a preform for a polarization retaining optical fiber which comprises steps of:

making at least two bores positioned symmetrically around a center axis of a preform comprising a core part and a cladding part which surrounds the core part,

connecting one end of a glass tube to one end of said preform, said glass tube having a part with a smaller inner diameter near its one end which is connected to said preform,

inserting a first glass rod, a stressing member and a second glass rod in this order into each bore through the end of each bore which is remote from said connected glass tube having said smaller diameter part,

contacting said first glass rod to said part of said glass tube with a smaller inner diameter, and

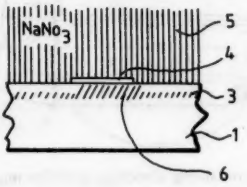
heating and fusing said second glass rod to said preform to thereby form said preform for a polarization retaining optical fiber.

5,160,523

METHOD OF PRODUCING OPTICAL WAVEGUIDES BY AN ION EXCHANGE TECHNIQUE ON A GLASS SUBSTRATE

Seppo Honkanen, Vantaa, and Ari Tervonen, Espoo, both of Finland, assignors to Oy Nokia AB, Helsinki, Finland

Filed Jun. 10, 1991, Ser. No. 713,422
Claims priority, application Finland, Jul. 10, 1990, 903487
Int. Cl.[5] C03C *21/00*
U.S. Cl. 65—30.13 **5 Claims**



1. A method of producing an optical waveguide including a patterned light channel comprising:

providing a glass substrate having a first refractive index,

diffusing first ions into a surface of said substrate for producing a planar zone at said surface having a second refractive index greater than said first refractive index,

forming an ion diffusion mask on said substrate surface overlying said zone, said mask having a shape corresponding to a desired light channel in said substrate,

diffusing said first ions from portions of said zone not covered by said mask outwardly from said substrate, and removing said mask.

5,160,524

INSTALLATION FOR THE HEATING, FORMING AND TEMPERING OF GLASS SHEETS

Robert Pernelle, Vernouillet, and Michel Agius, Santeuil, both of France, assignors to Selas S.A., Levallois-Perret, France

Filed Mar. 18, 1991, Ser. No. 673,179
Claims priority, application France, Mar. 30, 1990, 90 04097
Int. Cl.[5] C03B *23/03*
U.S. Cl. 65—268 **15 Claims**

1. In an installation for the heating, forming and tempering of glass sheets (8), comprising a furnace (1) for heating glass sheets, at least one forming chamber (4), called a standard forming chamber, and a chamber (6) for tempering the glass sheets, and means for supporting the glass sheets and for moving them in the furnace (1) and towards the chamber, the improvement wherein the installation further comprises one second forming chamber (5), called a deep-forming chamber, in which the forming of the glass sheets is carried out by pressing them on a convex lower surface, and a turn-over chamber (3) positioned between the furnace (1) and the forming chambers (4, 5); said turn-over chamber (3) comprising means for turning over the glass sheets (8) before they are introduced into the second forming chamber (5).

5,160,525

BIOREMEDIATION ENZYMATIC COMPOSITION

Neil W. Stillman, 1062 N. 24 St., Mesa, Ariz. 85213, and Edward J. Brown, 1642 Taroka Dr., Fairbanks, Ak. 99709

Continuation of Ser. No. 583,045, Sep. 14, 1990, abandoned. This application Mar. 14, 1991, Ser. No. 675,347

Int. Cl.[5] C05G *3/04*; C02F *1/00*

U.S. Cl. 71—64.1 2 Claims

1. A chemical product for accelerated biodegradation of petroleum on water consisting essentially of a mixture of a fermentation portion and an enzymatic portion comprising about 85% by weight water, about 2% by weight of a nonionic ethoxylated secondary alcohol having about 6–9 moles of ethylene oxide and 2% of a nonionic surfactant ethoxylated linear alcohol having about 6–9 moles of ethylene oxide, about 2–3% sodium borate, 0.2% by weight citric acid, about 1% by weight lactic acid, about 2% by weight tripolyphosphate and the balance monosodium glutamate.

5,160,526

ALKENE STABILIZERS FOR 3-ISOTHIAZOLONE COMPOUNDS

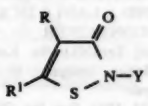
Tirthankar Ghosh, North Wales, and John R. Mattox, Perkasie, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Nov. 21, 1991, Ser. No. 795,579

Int. Cl.[5] A01N *43/80*; C07D *275/00, 275/04*

U.S. Cl. 71—67 20 Claims

1. A method of stabilizing 3-sothiazolone compounds of the formula



(I)

wherein R and R^1 are independently selected from hydrogen, halogen or a (C_1–C_4) alkyl group or alternatively may be joined to form a saturated, unsaturated or aromatic 5- or 6-membered fused carbocyclic ring; Y is hydrogen, an alkyl or substituted alkyl of 1 to 18 carbon atoms, an unsubstituted or halo-substituted alkenyl or alkynyl of 2 to 8 carbon atoms, a cycloalkyl or substituted cycloalkyl of 3 to 12 carbon atoms, an aralkyl or halo-, (C_1–C_4) alkyl-, or (C_1–C_4) alkoxy-substituted aralkyl of to 10 carbon atoms, or an aryl or halo-, (C_1–C_4) alkyl-, or (C_1–C_4) alkoxy-substituted aryl of up to 10 carbon atoms; against chemical decomposition comprising introducing a sufficient amount of an alkene having at least three carbon atoms to stabilize said 3-isothiazolone compound.

5,160,527

STABILIZED METAL SALT/3-ISOTHIAZOLONE COMBINATIONS

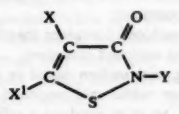
Andrew B. Law, Newtown, and Gary L. Willingham, Glenside, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed May 24, 1991, Ser. No. 708,004

Int. Cl.[5] C10M *105/30*

U.S. Cl. 71—67 11 Claims

1. A composition comprising:



(a) A 3-isothiazolone compound of the formula: wherein Y is an alkyl or substituted alkyl of 1 to 18 carbon atoms; an unsubstituted or halogen substituted alkenyl or alkynyl of 2 to 8 carbon atoms; a cycloalkyl or substituted cycloalkyl of 3 to 12 carbon atoms; an aralkyl or halogen-, lower alkyl-, or lower alkoxy-substituted aralkyl of up to 10 carbon atoms; or an aryl or halogen-, lower alkyl-, or lower alkoxy-substituted aryl of up to 10 carbon atoms; and X and X^1 are hydrogen, halogen, or a (C_1–C_4) alkyl;

(b) a stabilizing amount of a metal salt, said metal salts selected from the group where the cation is copper, zinc, manganese, ferrous or ferric, and the anion is selected from the group consisting of EDTA, 8-hydroxyquinolinate, gluconate, o-phenanthroline, quinolinate, N,N-bis(2-hydroxy-5-sulfobenzyl) glycine, lignosulfonate polymers, and polyacrylates; and

(c) a locus to be protected against the growth of algae, bacteria, or fungus consisting of a metal working fluid (MWF) comprising at least one component selected from the group consisting of an alkanolamine, a petroleum sulfonate emulsifier, a boric acid ester or boric acid amide, a corrosion inhibitor, and a fatty acid.

5,160,528

DELIVERY SYSTEM FOR AGRICULTURAL CHEMICALS

Ratan K. Chaudhuri, Butler; Kolazi S. Narayanan, Palisades Park, and Manilal Dahanayake, Wayne, all of N.J., assignors to ISP Investments Inc., Wilmington, Del.

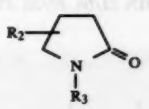
Continuation-in-part of Ser. No. 448,707, Dec. 11, 1989, Pat. No. 5,071,463. This application Apr. 5, 1990, Ser. No. 505,030

The portion of the term of this patent subsequent to Dec. 10, 2008, has been disclaimed.

Int. Cl.[5] A01N *57/00, 43/00, 43/48, 43/40, 37/00, 37/34, 37/10, 37/18, 47/28, 33/02, 31/00, 25/00*

U.S. Cl. 71—79 13 Claims

1. A stable emulsifiable concentrate comprising a herbicide which is substantially insoluble in water, an organic diluent, a surfactant and a solvent composed of a component being selected from the group consisting of pyrrolidones having the formula



wherein R_2 is hydrogen or alkyl having from 6 to 14 carbon atoms and R_3 is alkyl having from 6 to 14 carbon atoms with the proviso that at least one of R_2 or R_3 must contain at least 6 carbon atoms and the sum of the carbon atoms in R_2 and R_3 cannot exceed 14; alkyl gamma-butyrolactones, alkyl cyclic carbonates, and combinations thereof, wherein the alkyl portion may be distributed at one or more sites on the ring so long as one portion contains at least 6 carbon atoms and the total number of alkyl carbon atoms does not exceed 14, said component being present in an amount, in conjunction with a surfactant, effective to disperse the herbicide.

5,160,529
MICROCAPSULES AND MICROENCAPSULATION PROCESS

Herbert B. Scher, Moraga, and Marius Rodson, El Sobrante, both of Calif., assignors to Imperial Chemical Industries PLC, London, United Kingdom

Continuation-in-part of Ser. No. 540,560, Jun. 20, 1990, abandoned, which is a continuation of Ser. No. 151,048, Feb. 1, 1988, Pat. No. 4,956,129, which is a continuation-in-part of Ser. No. 595,136, Mar. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 499,973, Jun. 1, 1983, abandoned, which is a continuation-in-part of Ser. No. 201,686, Oct. 30, 1980, abandoned. This application Feb. 6, 1991, Ser. No. 651,836

The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.

Int. Cl.[5] A01N *37/18;* **B01J** *13/18*

U.S. Cl. 71—118 **31 Claims**

1. A microencapsulated herbicidal composition comprising a substantially water-insoluble anilide herbicide within a porous shell, having a slow release of said herbicide through said shell, said composition having been prepared by a process comprising:

a) providing an organic solution comprising said herbicide and an etherified amino resin prepolymer dissolved therein in which from about 50% to about 98% of the methylol groups of said prepolymer have been etherified with a C_4–C10 alcohol;

b) creating an emulsion of said organic solution in a continuous phase aqueous solution comprising water and a surface-active agent, wherein said emulsion comprises discrete droplets of said organic solution dispersed in said continuous phase aqueous solution, there being formed thereby an interface between the discrete droplets of organic solution and the surrounding continuous phase aqueous solution; and

c) causing in situ self-condensation and curing of said amino resin prepolymer in the organic phase of said discrete droplets adjacent to said interface by simultaneously heating said emulsion to a temperature between about 20° C. to about 100° C., and adding to said emulsion an acidifying agent and maintaining said emulsion at a pH of between about 0 to about 4 for a sufficient period of time to allow substantial completion of in situ condensation of said resin prepolymers to convert the liquid droplets of said organic solution to capsules consisting of solid permeable polymer shells enclosing said herbicide.

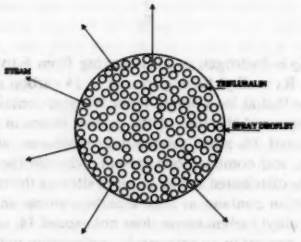
5,160,530
MICROENCAPSULATED POLYMORPHIC AGRICULTURALLY ACTIVE MATERIAL

John Misselbrook, Lawrenceville, N.J.; Edwin F. Hoff, Jr.; Elliot Bergman, both of Valdosta, Ga.; Larry J. McKinney, Hahira, and James H. LeFiles, Valdosta, both of Ga., assignors to Griffin Corporation, Valdosta, Ga.

Filed Jan. 24, 1989, Ser. No. 301,458

Int. Cl.[5] A01N *33/06, 37/20, 37/34, 41/06*

U.S. Cl. 71—121 **62 Claims**



1. A process for microencapsulating low-melting, agriculturally active materials which exhibit a plurality of heat-alterable polymorphic forms comprising the steps of:

heating to a molten state a low-melting, water immiscible, agriculturally active material which is normally solid at ambient temperatures and exhibits a plurality of heat-alterable polymorphic forms, said active material being in one polymorphic form prior to heating:

combining said molten active material substantially free of an organic solvent therefor, an aqueous solution of a water-soluble, film-forming polymer and an effective amount of a crystallization initiating compound selected from the group consisting of benzoic acid, sodium benzoate, salicylic acid, 3-hydroxybenzoic acid, 4-hydroxybenzoic acid and mixtures thereof at a temperature sufficient to maintain said active material in said molten state;

dispersing or emulsifying said active material in said aqueous solution so that said active material has a primary particle size of between approximately 0.1 and 10 microns;

spray drying the resulting dispersion or emulsion at a temperature between about 50° and 220° C. so as to microencapsulate said active material in said polymer; and

cooling the resulting microencapsulated active material to substantially solidify said active material, whereby at least a portion of the agriculturally active material exhibiting one of the plurality of polymorphic forms is converted to another heat-alterable polymorphic form.

5,160,531
VACCUM REFINING METHOD UTILIZING INDUCTION HEATER AROUND A LADLE IN A VACUUM CONTAINER

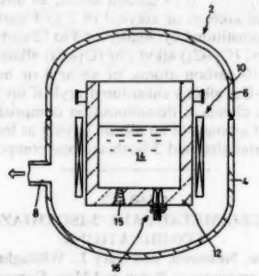
Koreaki Koizumi, Tokai; Teruhiko So, Konan, and Tetsuya Satio, Chita, all of Japan, assignors to Daido Tokushuko Kabushiki Kaisha, Japan

Filed Nov. 21, 1991, Ser. No. 795,837

Claims priority, application Japan, Nov. 30, 1990, 2-339101

Int. Cl.[5] C21C *7/10;* **C22B** *4/00*

U.S. Cl. 75—10.15 **12 Claims**



1. A vacuum refining method for refining a mass of molten metal which is obtained form a steel-making furnace or a steel-making secondary smelting furnace, comprising the steps of:

pouring said molten metal into a ladle;

introducing said ladle into an enclosed container such that said ladle is set inside an induction heater which is fixed in said enclosed container;

evacuating said enclosed container thereby creating a vacuum within said enclosed container;

induction-heating said molten metal in said ladle by said induction heater while said enclosed container is kept under vacuum, so as to produce a refined molten metal; and

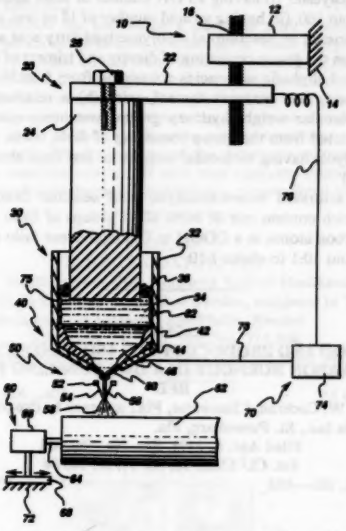
removing said ladle form said enclosed container, for pouring said refined molten metal into a casting mold outside said enclosed container.

5,160,532

DIRECT PROCESSING OF ELECTROSLAG REFINED METAL

Mark G. Benz, Burnt Hills, and Thomas F. Sawyer, Charlton, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 21, 1991, Ser. No. 779,773
Int. Cl.[5] C21C 1/00
U.S. Cl. 75—10.24 31 Claims



1. Apparatus for producing refined metal alloy which comprises

electroslag refining apparatus comprising a refining vessel adapted to receive and to hold a refining molten slag,

a body of molten slag in said vessel, said means for positioning an ingot as an electrode in said vessel in touching contact with said molten slag,

electric supply means adapted to supply refining current to an ingot as an electrode and through said molten slag to a body of refined metal beneath said slag to keep said refining slag molten and to melt the end of said ingot in contact with said slag.

means for advancing said ingot electrode toward and into contact with said molten slag at a rate corresponding to the rate at which the contacted surface of said electrode is melted as the refining thereof proceeds,

a cold hearth vessel beneath said electroslag refining apparatus, said cold hearth being adapted to receive and to hold electroslag refined molten metal in contact with a solid skull of said refined metal formed on the walls of said cold hearth vessel,

a body of refined molten metal in said vessel beneath said body of molten slag,

a cold finger apparatus below said cold hearth adapted to receive and to dispense as a stream refined molten metal processed through said electroslag refining process and through said cold hearth, said cold finger apparatus having a bottom pour orifice,

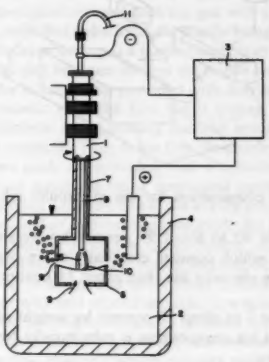
a skull of solidified refined metal in contact with said cold hearth and said cold finger apparatus including said bottom pour orifice, and means for converting the stream of molten metal passing from said bottom pour orifice into a refined solid metal body.

5,160,533

METHOD FOR GRAIN REFINING OF METALS

Erling Myrbostad, Kvanne, and Karl Venas, Saupstad, both of Norway, assignors to Norsk Hydro a.s., Oslo, Norway

PCT No. PCT/NO89/00068, § 371 Date Dec. 19, 1990, § 102(e) Date Dec. 19, 1990, PCT Pub. No. WO90/00205, PCT Pub. Date Jan. 11, 1990
PCT Filed Jun. 30, 1989, Ser. No. 623,989
Claims priority, application Norway, Jun. 30, 1988, 882934
Int. Cl.[5] C22B 4/00
U.S. Cl. 75—10.45 6 Claims



1. A method for grain refining of molten light metals, which comprises

providing a molten metal having a melt surface,

providing an electric arc over the surface of the molten metal,

simultaneously supplying gas surrounding the electric arc, ionizing the gas by means of the electric arc and distributing the ionized gas through the melt, and

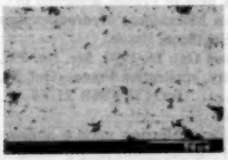
forming, in situ, grain refining means by reaction between the ionized gas and the molten metal.

5,160,534

TITANIUM-TUNGSTEN TARGET MATERIAL FOR SPUTTERING AND MANUFACTURING METHOD THEREFOR

Akitoshi Hiraki, Yasugi, Japan, assignor to Hitachi Metals Ltd., Tokyo, Japan

Filed May 31, 1991, Ser. No. 708,340
Claims priority, application Japan, Jun. 15, 1990, 2-157287; Nov. 27, 1990, 2-324910; Feb. 12, 1991, 3-40999; Mar. 20, 1991, 3-81634
Int. Cl.[5] G22F 9/00
U.S. Cl. 75—248 11 Claims



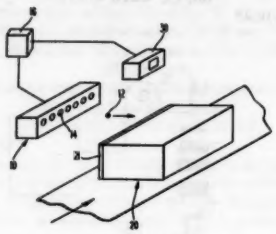
(×600)

1. A titanium-tungsten target material for a sputtering process with a structure consisting essentially of a tungsten phase, a titanium phase and a titanium-tungsten alloy phase, the titanium-tungsten alloy phase occupying an area ratio of 20% or more of a cross section of the structure of the titanium-tungsten target material.

5,160,535
RAPIDLY DRYING IMPULSE INK JET INK COMPOSITIONS

Theodore M. Cooke, Danbury, Conn., and Wilfred F. Reed, Ashland, Mass., assignors to Trident, Inc., Brookfield, Conn.

Filed Jan. 11, 1991, Ser. No. 640,277
Int. Cl.[5] C09D *11/02*
U.S. Cl. 106—19 R **27 Claims**



1. An ink composition for use in impulse ink jet printers, comprising:

from about 80 to about 99 percent by weight of a liquid vehicle which consists essentially of an organic solvent having a viscosity less than about 7.0 centipoise at 20° C.; and

from about 1 to about 20 percent by weight of a colorant; wherein said ink composition is substantially free of electrolytic moieties.

5,160,536
PRINTING INK FOR GOLF BALLS

Kevin M. Harris, New Bedford, and Thomas L. Mydlack, Fairhaven, both of Mass., assignors to Acushnet Company, New Bedford, Mass.

Filed Apr. 18, 1991, Ser. No. 687,396
Int. Cl.[5] C09D *11/14*
U.S. Cl. 106—19 R **14 Claims**

1. A golf ball printing ink comprising a pigment or a dye as a coloring matter, and a carrier for the coloring matter, said carrier comprising a solvent and a plasticizer and containing as an essential ingredient therein nitrocellulose.

5,160,537
CHROMIUM-NITROGEN ALLOY SURFACE COATING COMPOSITION

Jean-Paul Terrat, Saint-Etienne, and Pascal Fort, Villefranche De Rouergue, both of France, assignors to Centre Stephanois de Recherches Mecaniques Hydromecanique et Frottement, Andrezieux-Boutheon, France

Filed Oct. 16, 1990, Ser. No. 597,011
Claims priority, application France, Oct. 20, 1989, 89 13739
Int. Cl.[5] C04B *35/58*
U.S. Cl. 106—36 **5 Claims**

1. Coating for conferring upon a substrate good friction properties, said coating comprising a metastable alloy of chromium and nitrogen, wherein said alloy comprises, per one hundred atoms, from 87 to 68 atoms of chromium and from 13 to 32 atoms of nitrogen in two phases, consisting essentially of a cubic microcrystalline chromium phase containing including nitrogen and a quadratic chromium nitride phase with a stoichiometric deficient nitrogen content relative to the thermodynamic equilibrium hexagonal Cr_2N nitride.

5,160,538
INTERNAL RELEASE AGENTS, ACTIVE HYDROGEN CONTAINING MIXTURES WHICH CONTAIN SUCH AGENTS AND THE USE THEREOF IN A PROCESS FOR THE PRODUCTION OF MOLDED PRODUCTS

Robson Mafoti, Pittsburgh, Pa., assignor to Miles Inc., Pittsburgh, Pa.

Filed Apr. 22, 1991, Ser. No. 690,869
Int. Cl.[5] C09K *3/00*; B29C *45/00*; C08G *18/42*
U.S. Cl. 106—243 **9 Claims**

1. A novel release agent comprising the reaction product of

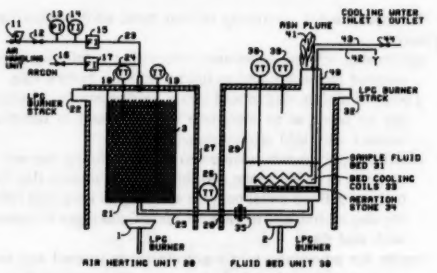
1) a polyester (i) having an OH number of from about 40 to about 160, (ii) having an acid number of 15 or less, and (iii) prepared by reacting (a) a polymerized fatty acid selected from the group consisting of dimers and trimers of unsaturated aliphatic monoacids containing from 8 to 24 carbon atoms, and mixtures thereof, with (b) a relatively low molecular weight hydroxy group containing compound selected from the group consisting of diols, triols, and/or polyols having molecular weights of less than about 500, and

2) a saturated monocarboxylic acid selected from those which contain one or more alkyl groups of from 4 to 22 carbon atoms, in a COOH to OH equivalent ratio of from about 10:1 to about 1:10.

5,160,539
METHOD AND PRODUCT OF FLY ASH BENEFICATION BY CARBON BURNOUT IN A DRY BUBBLING FLUID BED

Joseph W. Cochran, Clearwater, Fla., assignor to Progress Materials Inc., St. Petersburg, Fla.

Filed Apr. 5, 1991, Ser. No. 680,900
Int. Cl.[5] C04B *18/06, 14/36, 20/04*
U.S. Cl. 106—405 **10 Claims**



1. The method of reducing carbon content of fine particles of fly ash containing carbon, comprising

a) introducing said fly ash fine particles containing carbon to a dry bubbling fluid bed consisting essentially of said particles, and

b)oxidizing said carbon in the fly ash particles by intimately mixing said particles with air in said bed at a temperature of between about 1300° and about 1800° F.,

by introducing ambient air to said bed at a volume ratio of between about 1000 to about 1500, air to fly ash, at a velocity of between at least about 0.5, but less than about 3.0 ft./sec.,

and said particles having a residence time in said bed of at least about 2 minutes, but up to about 100 minutes,

c)then removing said fly ash particles from said bed,

wherein said particles have had the carbon content reduced by said oxidation, so that said removed fly ash particles are enhanced pozzolan suitable for use, without further processing, to replace a portion of the cement in concrete.

5,160,540

METHOD FOR PRODUCING OF CONCRETE WITH CONTROLLABLE DENSITY

Ingemar Johansson, and Kjell Svedman, both of Ange, Sweden, assignors to Danes Verkstader AB, Ange, Sweden

PCT No. PCT/SE88/00369, § 371 Date Jan. 8, 1990, § 102(e) Date Jan. 8, 1990, PCT Pub. No. WO89/00153, PCT Pub. Date Jan. 12, 1989

Continuation of Ser. No. 458,639, Jan. 8, 1990, abandoned. This PCT application Jul. 5, 1988, Ser. No. 725,414

Claims priority, application Sweden, Jul. 8, 1987, 8702806

Int. Cl.[5] C04B *21/00, 22/04*

U.S. Cl. 106—672 7 Claims

1. A method for producing a concrete with controllable density, which at the density of 1200 kg/m^3 has a compression strength of at least 3.5 MPa and after that linearly increases to at least 19 MPa at 2,00 kg/m^3, characterized in mixing a base concrete mixture mainly consisting of cement and water with a porousity mixture mainly consisting of cement, water and a foaming agent so that the foaming agent constitutes at least approximately 5% by volume of the porousity mixture, and that the resultant mixture of said base concrete mixture and said porousity mixtures is moulded in a conventional manner.

5,160,541

DOUBLE-COATING CUP

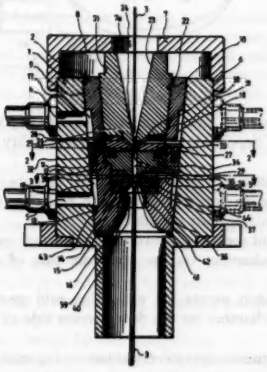
Peter R. Fickling; Sven-Erik Sundberg, both of Hudiksvall, and Mats H. Ericsson, Delsbo, all of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Jun. 14, 1991, Ser. No. 715,586

Claims priority, application Sweden, Jun. 21, 1990, 9002227-8

Int. Cl.[5] B05C *3/15*

U.S. Cl. 118—405 16 Claims



1. A double-coating cup for applying two protective coatings simultaneously to an optical fiber, comprising: a body having a fiber inlet side at which a fiber is to be introduced, said body being provided with an axially extending, frusto-conical boring whose largest diameter is located on the fiber inlet side; a die holder firmly pressed into the body and having a frusto-conical outer surface which corresponds in configuration to the boring in the body; and two die nozzles inserted in the die holder and functioning to apply two layers of coating material to an optical fiber, the body having two diametrically opposed first coating-material inlet channels spaced at a first axial distance from the inlet side, and two diametrically opposed second coating-material inlet channels spaced at a second axial distance from said inlet side, the die holder having a frusto-conical boring whose largest diameter lies on the fiber inlet-side, a first cylindrical boring which is a continuation of the conical boring, a first shoulder, a second smaller cylindrical boring, a second shoulder, and a third smallest cylindrical boring, an outer surface of the die holder having first ring-shaped slots located opposite the first inlet channels and first radial borings which connect with said ring-shaped slots and which open into a junction between the frusto-conical boring and the first cylindrical boring, and second ring-shaped slots which are located opposite the second inlet channels and which connect with second radial borings which open into the second cylindrical boring; an inlet guide die having a frusto-conical outer surface, the guide die being positioned in the conical boring of the die holder and including a frusto-conical inlet boring which merges with a cylindrical guide boring in a frusto-conical outwardly projecting part in an outlet end-wall of said guide die; said two die nozzles including first and second cylindrical die nozzles, said first cylindrical die nozzle having a frusto-conical recess which merges with a cylindrical nozzle boring, said first cylindrical die nozzle being positioned in the first cylindrical boring in a manner such as to form a first coating-material slot between the first die nozzle and the guide die, said first die nozzle being provided with distribution channels which connect with the first radial boring and which function to distribute a first coating material around the fiber and therewith center the fiber in the first die nozzle; a cylindrical intermediate guide die provided with a cylindrical boring, said intermediate guide die being positioned against the first shoulder and having a frusto-conical outwardly projecting part in an outlet end-wall of said intermediate guide die; said second cylindrical die nozzle having a frusto-conical recess which merges with a cylindrical nozzle boring said second cylindrical die nozzle being positioned in the second cylindrical boring and in abutment with said second shoulder in a manner such as to form a second coating-material slot between the second die nozzle and the intermediate guide die, said second die nozzle having distribution channels which connect with the second radial borings and which distribute a second coating material around the fiber coated with said first coating material and therewith center the fiber in said second die nozzle.

5,160,542

APPARATUS FOR VAPORIZING AND SUPPLYING ORGANOMETAL COMPOUNDS

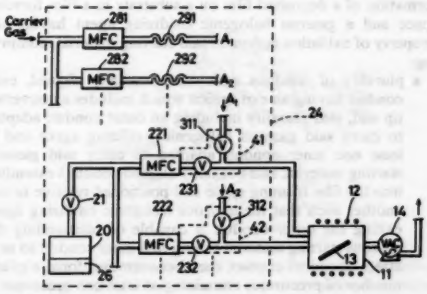
Hiroshi Mihira; Tetsuo Shimizu, both of Kyoto; Kazuhiro Hirahara; Toshinobu Ishihara, both of Nigata, and Seiki Takaya, Kanagawa, all of Japan, assignors to Stec Inc., Kyoto and Shin-Etsu Chemical Co., Ltd., Tokyo, both of, Japan

Filed Sep. 11, 1990, Ser. No. 580,587

Claims priority, application Japan, Sep. 12, 1989, 1-234766; Sep. 12, 1989, 1-234767

Int. Cl.[5] C23C *16/00*

U.S. Cl. 118—715 9 Claims



5. An apparatus for vaporizing and supplying an organometal compound comprising:

multiple branched main gas flow paths for passing vaporized organometallic compound from a container to a crystal growth chamber having heating means and means for reducing the pressure therein through a first main valve,

main massflow controllers having discharge outlets, and second main valves having discharge outlets;

multiple branched carrier gas flow paths for passing carrier gas from a carrier gas source to the discharge outlets of the second main valves through carrier gas massflow controllers, heat exchangers and carrier gas valves; and

a constant temperature oven for holding the multiple branched main gas flow paths including the first main valve, the main massflow controllers and the second main valves; the container; and the multiple branched carrier gas flow paths including the carrier gas massflow controllers, the heat exchangers and the carrier gas valves, each of the second main valves and each of the second carrier gas valves being integrated into a block valve, which is directly connected to a discharge outlet of each of the main massflow controllers.

5,160,543

DEVICE FOR FORMING A DEPOSITED FILM

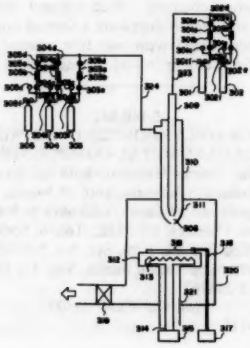
Shunichi Ishihara, Ebina; Masaaki Hirooka, Toride; Jun-Ichi Hanna, and Isamu Shimizu, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 441,223, Nov. 27, 1989, abandoned, which is a continuation of Ser. No. 943,429, Dec. 19, 1986, abandoned. This application Feb. 21, 1992, Ser. No. 837,601

Claims priority, application Japan, Dec. 20, 1985, 60-287103; Dec. 27, 1985, 60-297212; Dec. 28, 1985, 60-297836

Int. Cl.[5] C23C *16/00*

U.S. Cl. 118—715 **4 Claims**



1. A device for introducing a gaseous starting material for formation of a deposited film on a substrate in a film forming space and a gaseous halogenic oxidizing agent having the property of oxidation action on said starting material, comprising:

a plurality of conduits which are coaxially aligned, each conduit having an exit orifice which includes a converted tip end, said plurality including an outer conduit adapted to carry said gaseous halogenic oxidizing agent and at least one inner conduit adapted to carry said gaseous starting material, said coaxially aligned conduits extending into the film forming space and positioned relative to one another such that the aqueous halogenic oxidizing agent exiting the outer conduit is capable of surrounding the gaseous starting material exiting said inner conduit so as to effect chemical contact therebetween and form a plural number of precursors containing at least one precursor in an excited state and thereby forming the deposited film on said substrate using said at least one precursor as a feeding source for a constituent element of the deposited film, and

a means for positioning said substrate in said film forming space, said substrate spaced by said means for positioning said substrate such that said substrate is from several millimeters to 20 centimeters from the exit orifice of said outer conduit, wherein said exit orifice of the outer conduit extends coaxially beyond the exit orifice of said at least one inner conduit by about 1 cm, thereby forming a meeting space for said gaseous starting material and said gaseous oxidizing agent.

5,160,544

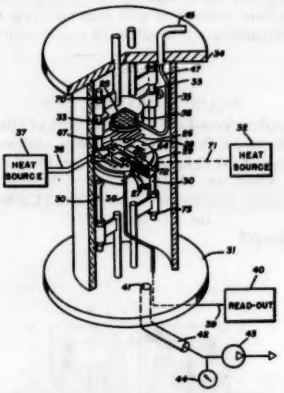
HOT FILAMENT CHEMICAL VAPOR DEPOSITION REACTOR

Diwakar Garg, Macungie, Pa.; Wilman Tsai, Cupertino, Calif.; Robert L. Iampietro, Emmaus, Pa.; Fred M. Kimock, Macungie, Pa., and C. Michael Kelly, Berwyn, Pa., assignors to Diamonex Incorporated, Allentown, Pa.

Continuation-in-part of Ser. No. 497,159, Mar. 20, 1990, abandoned. This application Sep. 6, 1990, Ser. No. 578,734

Int. Cl.[5] C23C *16/44, 16/48*

U.S. Cl. 118—724 **28 Claims**



1. An improved hot filament chemical vapor deposition apparatus for deposition of material on a plurality of substrates comprising:

reactor wall means defining a reactor chamber;

support means for supporting the plurality of substrates within said reactor chamber;

inlet conduit means for introducing reactant gases into said reactor chamber on the upstream side of said support means;

outlet conduit means for extracting said gases from said reactor chamber on the downstream side of said support means;

dispersion means operatively connected to said inlet conduit means;

said dispersion means and said support means defining a reaction zone therebetween; and

heater means interposed between said dispersion means and said support means for heating and activating said reactant gases;

said dispersion means having a configuration to introduce reactant gases to said reaction zone with a substantially uniform velocity;

said support means having a configuration and position to substantially reduce stagnation point flow of said reactant gases adjacent to the substrates supported within said reaction zone;

said support means comprising an apertured plate interposed between said dispersion means and said outlet conduit means;

said apertured plate comprising a plurality of uniform apertures configured and positioned in relationship to said dispersion means and heater means to substantially reduce

stagnation point flow of said reactant gases adjacent to the substrates; and

said support means thereby reducing the radial flow of said gases to provide substantially uniform coating of the substrates.

5,160,545

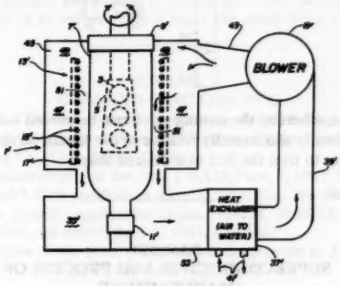
METHOD AND APPARATUS FOR EPITAXIAL DEPOSITION

James R. Maloney, San Jose, and Joseph C. Moore, Milpitas, both of Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.

Continuation of Ser. No. 306,376, Feb. 3, 1989, abandoned. This application Sep. 26, 1991, Ser. No. 767,526

Int. Cl.[5] C23C *16/00*

U.S. Cl. 118—725 **15 Claims**



1. An epitaxial deposition apparatus comprising in combination:

a reaction chamber for containing a semiconductor substrate supported on a susceptor and for confining a thermally activated reactive gas therewithin, said reaction chamber having at least a wall portion thereof made of a material which is substantially transparent to thermal radiation within a certain region of wavelengths;

a radiant heater bank for supplying thermal radiation within said certain region of wavelengths for heating said substrate and susceptor;

support means for: (1) supporting said radiant heater bank in a preselected fixed operating position in which said radiant heater bank radiates thermal radiation through said wall portion to heat said substrate and susceptor, and (2) supporting said heater bank in an open position in which said bank is pivoted away from said fixed operating position about a pivot axis lying generally parallel to one edge of said bank,

said support means further comprising:

translational support means for: (1) permitting translational motion of said bank substantially without rotation of said bank, and constraining such translational motion along a translation axis from said open position to a release position in which said bank can be lifted free of remaining portions of the apparatus, and (2) continuously supporting said bank during translational motion between said open and released positions.

7. An epitaxial deposition apparatus comprising in combination:

a reaction chamber for containing a semiconductor substrate supported on a susceptor and for confining a thermally activated reactive gas therewithin, said reaction chamber having at least a wall portion thereof made of a material which is substantially transparent to thermal radiation within a certain region of wavelengths;

a radiant heater array for supplying thermal radiation within said certain region of wavelengths for heating said substrate and susceptor, said heater array being distributed generally coaxially around and spaced from said reaction chamber to define an inner coaxial cooling airspace between said reaction chamber and said distributed radiant heater array, said heater array being radially air-permeable to permit a radial cooling air flow therethrough;

a plenum chamber extending in a generally continuous and unbroken manner, substantially free of intervening partitions, throughout the region: (1) generally coaxially around and spaced from said radiant heater array to define an outer coaxial cooling airspace between said plenum chamber and said radiant heater, and (2) generally transversely across and spaced from one end of said radiant heater array to form an end coaxial cooling airspace radially interconnecting said inner and outer coaxial cooling airspaces at said one end; and,

an air-cooling means, having an inlet port for drawing in heated air and an outlet port for ejecting cool air, one of said ports being connected to said plenum chamber and the other of said ports being connected to said inner coaxial cooling airspace, for producing a flow of cooling air through said apparatus.

5,160,546

LACTITOL TRIHYDRATE CRYSTAL, CRYSTALLINE MIXTURE SOLID CONTAINING IT AND PROCESS FOR PREPARING THEM

Shigeru Kawashima; Hiroshi Ide, both of Shizuoka; Kazuaki Kato, Saitama; Mitsuo Magara, and Yoshibumi Ishii, both of Shizuoka, all of Japan, assignors to Towa Chemical Industry Co., Ltd., Tokyo, Japan

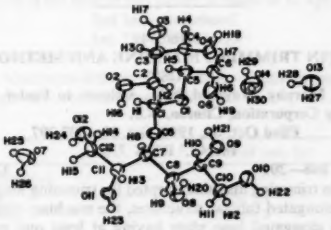
Division of Ser. No. 469,342, Jan. 24, 1990, Pat. No. 4,999,058. This application Jan. 2, 1991, Ser. No. 636,589

Claims priority, application Japan, Jan. 31, 1989, 1-19451

The portion of the term of this patent subsequent to Mar. 12, 2008, has been disclaimed.

Int. Cl.[5] C13F *1/02;* **A61K** *47/00;* **A23G** *1/00, 3/00*

U.S. Cl. 127—60 **9 Claims**



1. A process for producing a trihydrate crystal of lactitol comprising crystallizing from an aqueous lactitol solution, wherein a trihydrate crystal of lactitol or a crystalline mixture containing a trihydrate crystal of lactitol as a seed crystal is also present, a trihydrate crystal of lactitol having a molecular formula $C_{12}H_{24}O_{11}.3H_2O$ and a melting point of 52°–56° C., wherein the temperature of said crystallizing is from 0° to 30° C., and collecting said trihydrate crystal.

5,160,547

PROCESS FOR REMOVING COATINGS FROM SENSITIVE SUBSTRATES, AND BLASTING MEDIA USEFUL THEREIN

Lawrence Kirschner, Flanders; Michael S. Lajoie, Basking Ridge, both of N.J., and William E. Spears, Jr., Houston, Tex., assignors to Church & Dwight Co., Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 323,412, Mar. 14, 1989, abandoned, and a continuation-in-part of Ser. No. 506,447, Apr. 6, 1990, abandoned. This application May 17, 1991, Ser. No. 702,049

Int. Cl.[5] B08B *7/00;* **C09K** *3/14*

U.S. Cl. 134—7 **5 Claims**

1. A process for removing coatings from sensitive metal and composite surfaces, which comprises blasting said surfaces with a substantially water saturated compressed air stream under pressures of 10–150 psi, said stream containing as a blasting medium sodium bicarbonate particles having particle sizes within the range of 250–300 microns, in admixture with from 0.2 to 3% of a hydrophobic silica flow/anti-caking agent, by weight of the bicarbonate.

5,160,548

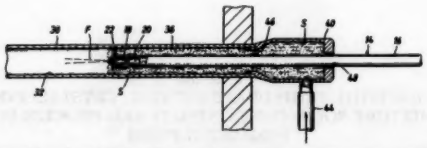
METHOD FOR CLEANING TUBE BUNDLES USING A SLURRY

Thomas B. Boisture, Baytown, Tex., assignor to Ohmstede Mechanical Services, Inc., Baytown, Tex.

Filed Sep. 9, 1991, Ser. No. 756,616

Int. Cl.[5] B08B *9/02;* **B24C** *1/00*

U.S. Cl. 134—7 **9 Claims**



1. A method for cleaning the interior wall of a tube with a slurry and a tubular lance, comprising the steps of:

inserting an end of the tubular lance in the tube;

pumping a fluid through the tubular lance and into the tube;

pumping the slurry into an annular area formed between the tubular lance and the interior wall of the tube at the end of the tube being cleaned;

mixing the slurry with the fluid at the end of the tubular lance in the tube; and

propelling the slurry and fluid mixture against the interior tube wall at the end of the tubular lance to clean the interior wall of the tube.

5,160,549

TUBE FIN TRIMMING MACHINE AND METHOD FOR USE

John Q. Murphy, Wayland, N.Y., assignor to Foster Wheeler Energy Corporation, Clinton, N.J.

Filed Oct. 31, 1990, Ser. No. 607,297

Int. Cl.[5] B23K *7/00*

U.S. Cl. 148—201 **13 Claims**

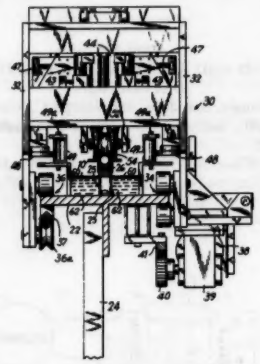
1. A fin trimming machine adapted for trimming longitudinal fins on elongated tubular structures, the machine comprising:

(a) an elongated base plate having at least one guideway extending parallel with said base plate;

(b) support means attached to said base plate and adapted for holding an elongated finned tubular structure;

(c) a carriage unit supported on said base plate and which is longitudinally movable along said guideway, said carriage unit including dual side members which are spaced apart on each side of said support means; and

(d) at least one cutting torch unit moveably mounted on said carriage unit, said torch unit being located above a fin of the elongated finned tubular structure and being laterally and vertically movable relative to the finned tubular structure, whereby the cutting torch can be moved both longitudinally and laterally relative to the tubular structure fins so as to trim the fins to a desired shape.



5,160,550

SUPERCONDUCTOR AND PROCESS OF MANUFACTURE

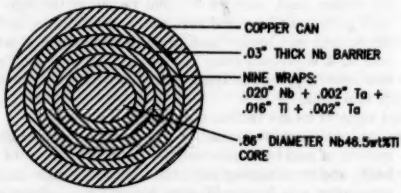
James Wong, Wayland, and Mark K. Rudziak, Westminister, both of Mass., assignors to Composite Materials Technology, Inc., Shrewsbury, Mass.

Continuation-in-part of Ser. No. 480,236, Feb. 15, 1990, and a continuation-in-part of Ser. No. 540,193, Jun. 19, 1990, and a continuation-in-part of Ser. No. 363,634, Jun. 8, 1989, Pat. No. 4,925,741. This application Jul. 31, 1990, Ser. No. 560,163

The portion of the term of this patent subsequent to Oct. 27, 2009, has been disclaimed.

Int. Cl.[5] C22C *1/18;* **H01L** *39/12, 39/24;* **H01B** *12/02*

U.S. Cl. 148—96 **7 Claims**



1. A method for producing a superconductor comprising the steps of combining a plurality of metal bodies to form a composite structure, said metal bodies being selected from transition metals such as niobium, tantalum, titanium, zirconium, hafnium and vanadium, alternate bodies being formed of different transition metals to form triplets, reacting the transition metals to form a ductile superconducting ternary alloy at the interfaces of these triplets of metals, limiting the extent of the reaction so as to maintain areas of pure or nearly pure transition metal along with the superconducting ternary alloy in at least one of each said triplet of transition metals, mechanically reducing the composite structure and providing further diffusion to produce a superconductive layer in contact with a non superconducting layer in each said triplet, each said layer being less than 1000 Å thick.

5,160,551

ACTIVATOR FOR USE IN PHOSPHATING PROCESSES

Rüdiger Rein, Breidenbach; Dieter Jentsch, Langen, and Kalus-Werner Wittel, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 17, 1991, Ser. No. 686,825

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1990, 4012795

Int. Cl.[5] C23C *22/00*

U.S. Cl. 148—254 11 Claims

1. An activating composition including an activating agent for the activation of metal surfaces before a zinc phosphating treatment, comprising titanium(IV) phosphate and further containing at least one copper compound, said activating agent having a Ti:Cu weight ratio of 1:100 to 60:1 where in said composition contains 0.001 to 0.060 g/l Ti 0.020 to 1.2 g/l/l orthophosphate (calculated as P_2O_5), and 0.001 to 0.1 g/l Cu and alkali in an amount that it has a PH value from 7 to 11.

5,160,552

COLORED ZINC COATING

Masatoshi Tomita; Susumu Yamamoto, both of Kurobe, and Chikara Tominaga, Tokyo, all of Japan, assignors to Nippon Mining Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 116,613, Nov. 3, 1987, Pat. No. 5,022,937. This application May 2, 1991, Ser. No. 694,749

Claims priority, application Japan, Nov. 21, 1986, 61-278175; Apr. 3, 1987, 62-81059; Apr. 3, 1987, 62-81063

The portion of the term of this patent subsequent to Jun. 11, 2008, has been disclaimed.

Int. Cl.[5] C23C *8/00*

U.S. Cl. 148—277 24 Claims

1. A method of forming a colorized zinc coating on an iron or steel surface characterized in that using a galvanizing zinc alloy comprising 0.15 to less than 0.3 wt. % Ti, said iron or steel surface coated on a hot dipping bath of said alloy at a temperature of 470° to less than 550° C. and the coated surface obtained is heated to a temperature of 450° to 520° C. followed by cooling whereby a coating having a purple color is formed.

5,160,553

COLD-WORKED STEEL OF HIGH COMPRESSIVE STRENGTH AND ARTICLES MADE THEREOF

Karl Leban, Weiner Neustadt, and Herbert Schweiger, Wartberg i. Mürztal, both of Austria, assignors to Bohler Gesellschaft m.b.H., Kapfenberg, Austria

Filed Oct. 23, 1990, Ser. No. 601,676

Claims priority, application Austria, Oct. 23, 1989, 2423/89

Int. Cl.[5] C22C *38/18, 38/22*

U.S. Cl. 148—318 7 Claims

1. An article made from a cold-worked steel with high compressive strength greater than 3022 N/mm^2, which has its contents consisting essentially, in % by weight, of the following elements:

C: 0.6 to 1.5
Si: 0.2 to 1.6
Mn: 0.2 to 1.2
Cr: 5.0 to 10.0
Mo: up to 3.0
W: up to 6.0
(Mo+2W): 1.0 to 3.0
V: 0.3 to 1.5
Al: 0.2 to 1.6
Nb: 0.02 to 0.35
N: 0.01 to 0.06

and the remainder of the contents being iron and process-entailed contaminations, and in addition said article has an outer surface anti-wear layer made at a high temperature no greater than 600° C.

5,160,554

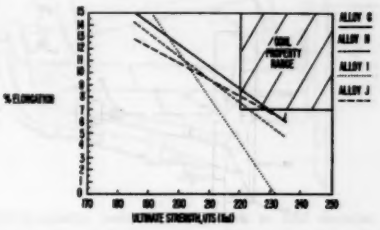
ALPHA-BETA TITANIUM-BASE ALLOY AND FASTENER MADE THEREFROM

Paul J. Bania, Boulder City; Roy E. Adams, Henderson, both of Nev., and James Stokes, Ridgecrest, Calif., assignors to Titanium Metals Corporation, Denver, Colo.

Filed Aug. 27, 1991, Ser. No. 750,420

Int. Cl.[5] C22C *14/00*

U.S. Cl. 148—407 7 Claims



1. An alpha-beta titanium-base alloy having in combination ultimate tensile strength of at least 220 ksi with a minimum elongation of 7% in the solution-treated and aged condition, said alloy consisting essentially of, in weight percent, a total alpha stabilizer content of 1.5 to 3.5, 5 to 7 vanadium, 5 to 7 molybdenum, 5 to 7 iron and balance titanium.

5,160,555

ALUMINUM-LITHIUM ALLOY ARTICLE

G. Hari Narayanan, Seattle, and William E. Quist, Redmond, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 478,703, Feb. 2, 1990, abandoned, which is a continuation of Ser. No. 069,815, Sep. 23, 1987, abandoned, which is a continuation of Ser. No. 567,355, Dec. 30, 1983, Pat. No. 4,735,774. This application Feb. 27, 1991, Ser. No. 661,214

The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.

Int. Cl.[5] C22C *21/12*

U.S. Cl. 148—417 12 Claims

1. An aluminum-lithium alloy article exhibiting good fracture toughness consisting essentially of

	Amount (wt. %)
Element	
Li	2.3 to 2.7
Mg	0.8 to 1.2
Cu	1.3 to 1.9
Zr	0.15 max
Fe	0.15 max
Si	0.12 max
Other trace elements	0.25 max
Al	Balance

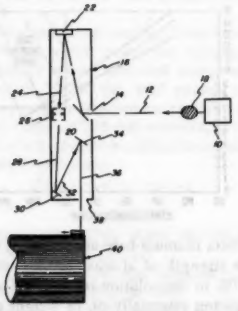
said alloy article having ultimate strength ranging from about 62 to about 70 ksi with fracture toughness on the order of 650 to 850 in-lbs/in^2.

5,160,556

METHOD OF HARDENING CORRUGATING ROLLS

Glenn F. Hyde, Timonium, and Robert R. Ulrich, Eldersburg, both of Md., assignors to United Container Machinery Group, Inc., Glen Arm, Md.

Continuation-in-part of Ser. No. 570,936, Aug. 22, 1990. This application Aug. 31, 1990, Ser. No. 575,928
Int. Cl.[5] C21D *1/09*
U.S. Cl. 148—525 16 Claims



1. A method of heat treating longitudinally extending, sinuously shaped projections, said projections consisting of roots and tips, with flanks intermediate said roots and tips, comprising the steps of:

providing a laser having a Gaussian beam output;

reconfiguring said beam from a Gaussian beam to provide a reconfigured beam being wide enough to span one complete projection, where said reconfigured beam has a uniform energy level directed at said roots and flanks, and a lesser energy level directed at said tips;

centering said reconfigured beam on said projection;

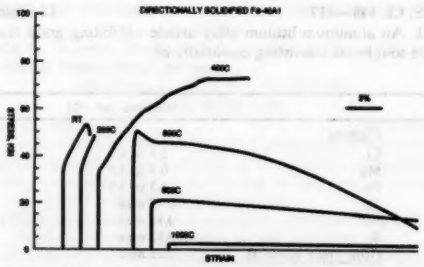
heat treating said projection to a desired hardness by causing relative movement between the projection and said reconfigured beam.

5,160,557

METHOD FOR IMPROVING LOW TEMPERATURE DUCTILITY OF DIRECTIONALLY SOLIDIFIED IRON-ALUMINIDES

Keh-Minn Chang, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 26, 1991, Ser. No. 736,147
Int. Cl.[5] C21D *8/00*
U.S. Cl. 148—546 9 Claims



1. A method of improving the low temperature ductility of iron-aluminides which comprises

providing an alloy a consisting essentially of iron-aluminides having 30 to 50 atom percent aluminum,

said alloy having a substituent for the iron of up to 10 atom percent of a metal selected from the group consisting of nickel, cobalt, chromium, and manganese,

said alloy having a substituent for the aluminum of said alloy of up to 5 atom percent of a metal selected from the group consisting of titanium, niobium, tantalum, hafnium, zirconium, vanadium, and silicon,

directionally solidifying said alloy,

said alloy having a B2 crystal structure,

heating said alloy to above its Ductile Brittle Transition Temperature, and

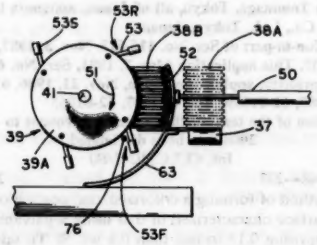
deforming said selected alloy at a temperature above its Ductile Brittle Transition Temperature, thereby to substantially improve the ductility of the alloy at temperatures below the Ductile Brittle Transition Temperature.

5,160,558

PETRI DISH STACK TRANSFER SYSTEM

James H. Gardener, 8101 S. Victor Pike, Bloomington, Ind. 47403

Filed Aug. 6, 1990, Ser. No. 562,792
Int. Cl.[5] B32B *35/00*
U.S. Cl. 156—60 26 Claims



1. In a system comprising an article conveyor, assembler means for receiving articles from the conveyor and assembling the articles into a plurality of bunches of articles, the improvement comprising:

a wheel;

first transfer means for taking bunches of articles from the plurality of bunches and pushing the bunches, one bunch at a time, onto the wheel;

retainers on the wheel and operable, when actuated, to hold the bunches on the wheel; and

an output conveyor associated with the wheel and having retainers operable, when actuated, to receive bunches sequentially from the wheel.

5,160,559

METHOD FOR FORMING A GUIDE CATHETER TIP BOND

Brian J. Scovil, New Hope, and Henry J. Pepin, Loretto, both of Minn., assignors to Scimed Life Systems, Inc., Maple Grove, Minn.

Filed Oct. 31, 1990, Ser. No. 606,090
Int. Cl.[5] A61M *25/00*; B29C *65/02*
U.S. Cl. 156—73.6 11 Claims

1. A method of forming a guide catheter having a soft deformable tip on a distal end thereof, comprises the steps of:

providing a tubular, deformable tip having a mating proximal end;

providing a tubular member having a mating distal end, the tubular member being stiffer then the tubular, deformable tip;

butting the mating proximal end of the deformable tip up against the mating distal end of the tubular member to form a butt joint;

softening the butt joint to render the mating proximal end of the deformable tip and the mating distal end of the tubular member flowable;

longitudinally oscillating both the deformable tip and tubular member such that the mating ends of the deformable tip and tubular member flow into one another to form a connection zone; and

solidifying the connection zone to firmly couple the deformable tip to the tubular member, thereby forming a guide catheter having a soft deformable tip.

5,160,560

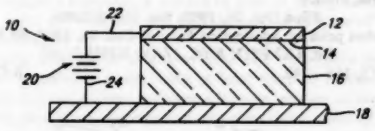
METHOD OF PRODUCING OPTICALLY FLAT SURFACES ON PROCESSED SILICON WAFERS

Murray S. Welkowsky, Chatsworth; P. K. Vasudev, Thousand Oaks; Philip G. Reif, Chatsworth, and Norman W. Goodwin, Encino, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 2, 1988, Ser. No. 201,809

Int. Cl.[5] B32B *31/16*

U.S. Cl. 156—154 **2 Claims**



1. A method of producing a device having an optically flat thin silicon wafer bonded to a glass substrate having a coefficient of thermal expansion which is matched to that of the silicon wafer, said method comprising:

coating the silicon wafer on its bottom surface with SiO_2;

bringing the bottom surface of the silicon wafer into intimate contact with the substrate;

heating the silicon wafer and the substrate to a temperature which is near the annealing point of the glass substrate;

applying a direct current voltage of about 1,000 volts across the wafer and the substrate until the current thereby produced lowers and stabilizes, whereby an electrostatic field assisted thermal bond is created between the wafer and the substrate; and

polishing the silicon wafer to achieve optical flatness.

5,160,561

METHOD FOR WINDING A PLURALITY OF LENGTHS OF THERMOPLASTIC RESIN IMPREGNATED YARNS USING A HEATED GUIDE EYE

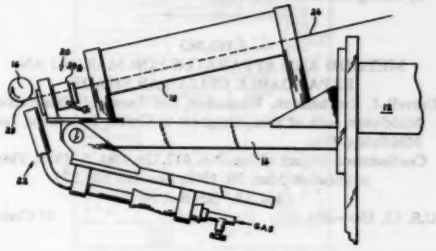
Mark B. Gruber, New Castle, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 387,363, Jul. 19, 1989, abandoned, which is a continuation of Ser. No. 95,235, Sep. 11, 1987, abandoned. This application Feb. 1, 1991, Ser. No. 649,353

Int. Cl.[5] B65H *81/00*

U.S. Cl. 156—175 **1 Claim**

1. A method of building and consolidating a composite structure from a plurality of tows of thermoplastic resin reinforced with yarn comprising: the steps of advancing a plurality of lengths of said tows under tension from a source of supply to a laydown location on a rotating mandrel at speeds of 25 ft./min. and above; guiding said lengths in a helical path by means of a circular eye guide axially traversing said mandrel to form said structure, said thermoplastic resin having a melt temperature and a degradation temperature, said lengths advancing from said source of supply successively through a first heating source to heat said lengths from above said melt temperature to below said degradation temperature, then through said guide; heating said guide by means of an electrically energized band heater wrapped around said guide to a temperature in a range of from above the melt temperature to below the degradation temperature of said thermoplastic resin, whereby



said thermoplastic resin does not stick to said circular eye guide and said yarn does not fuzz after passing through said circular eye guide at winding speeds of 25 ft./min. and above; and heating said surface of said structure at said laydown location with a third heating source to ensure molten mating surfaces at said laydown location.

5,160,562

PROCESS FOR PRODUCING A HOLLOW FIBER-COMPOSITE BODY

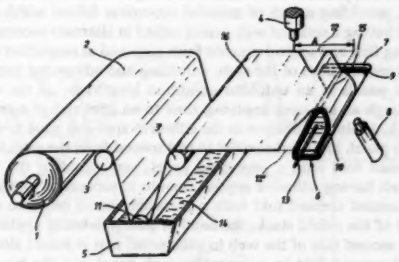
Ingo Kuch, and Jürgen Kretschmer, both of Esslingen, Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Aug. 8, 1991, Ser. No. 743,482

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1990, 4028583

Int. Cl.[5] B32B *31/04*

U.S. Cl. 156—189 **2 Claims**



1. Process for producing a hollow fiber reinforced plastic composite body from wound fibers, running in a plurality of directions and embedded in a curable plastics matrix, having at least one lug integrated without any interruption into the fiber reinforced plastic composite body and protruding from the hollow fiber reinforced plastic composite body, comprising:

a) forming a plastics-impregnated and circumferentially continuously wound jacket by continuously winding with a plurality of revolutions onto a shaping core a plurality of layers of at least one fiber reinforced plastic web comprising crossing groups of parallel-running fibers embedded in a plastic matrix;

b) shaping and securing the lug by a support corresponding to a set-up lug shape and which protrudes during winding from the shaping core;

c) cutting into the web for each separate layer during wind-

ing a lug free cut that corresponds to the position and contour of the respective lug;

d) pressing the web around the lug free cut into place without any folds onto said support or onto the layers already laid onto said support with each revolution of the shaping core and for each lug to produce a finished shaped blank; and

e) curing the finished shaped blank.

5,160,563

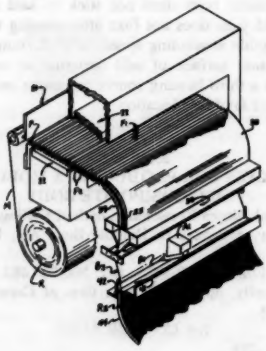
METHOD AND APPARATUS FOR MAKING AN EXPANDABLE CELLULAR SHADE

Darrell J. Kutchmarek, Waunakee, and James H. Stauffacher, Middleton, both of Wis., assignors to Graber Industries, Inc., Middleton, Wis.

Continuation-in-part of Ser. No. 417,725, Oct. 5, 1989. This application Mar. 30, 1990, Ser. No. 502,575

Int. Cl.[5] B32B *3/28*

U.S. Cl. 156—204 **37 Claims**



1. A process of making a pleated expandable and collapsible multi-cell product for window coverings and the like comprising, providing a web of material accordion folded widthwise and having a series of web panels united in alternate succession along first and second creased folds disposed at respective first and second sides of the web, unfolding and advancing successive panels in an unfolded condition lengthwise of the web through an adhesive applying zone to an inlet end of a refold stack, applying adhesive in the adhesive applying zone to each web panel, in a band parallel to and spaced from the associated creased fold with a preceding panel, and refolding the web panels having adhesive applied thereto in succession along the associated creased fold with a preceding panel onto the inlet end of the refold stack, the band of adhesive being applied at the second side of the web to each panel that is joined along a first creased fold to a preceding web panel and the band of adhesive being applied at the first side of the web to each panel that is joined along a second creased fold to a preceding panel.

5,160,564

PROCESS FOR PRODUCING A THERMAL STENCIL MASTER SHEET FOR STENCIL PRINTING

Takanori Hasegawa, and Shoichi Ikejima, both of Tokyo, Japan, assignors to Riso Kagaku Corporation, Tokyo, Japan

Filed Jul. 6, 1988, Ser. No. 215,548

Claims priority, application Japan, Jul. 7, 1987, 62-169529

Int. Cl.[5] B29B *17/00;* **B29C** *47/02*

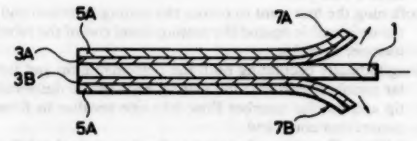
U.S. Cl. 156—231 **10 Claims**

1. A process for producing thermal stencil master sheets for stencil printing, comprising the steps of:

providing a flexible base film having a pair of opposed major surfaces;

laminating a thermoplastic film onto each of the major surfaces of said base film;

bonding a porous substrate onto each of said thermoplastic film; and



stripping from said base film both of said thermoplastic films and said porous substrates bonded thereto.

5,160,565

PROCESS FOR THE PRODUCTION OF AN IMAGE INTENSIFIER MODULE FOR OPTICAL FIBRE ILLUMINATED SIGNS

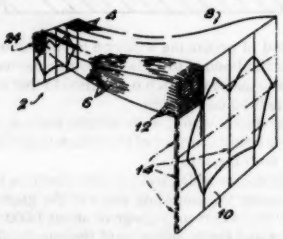
Michel Chazalon, Maurepas; Didier Gauthereau, Vernouillet; Patrice Micolon, Viroflay, and Serge Palanque, Les Ulis, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Oct. 24, 1990, Ser. No. 602,484

Claims priority, application France, Oct. 26, 1989, 89 14043

Int. Cl.[5] F21V *8/00, 17/04;* **B29D** *11/00*

U.S. Cl. 156—242 **8 Claims**



1. Process for the production of an image intensifier module for optical fibre illuminated signs comprising an input face (2) for receiving the image to be intensified and constituted by first ends (4) of optical fibres (6) of a bundle (8), said first ends (4) being contiguous; said optical fibre bundle (8); and an output (10) for reconstituting the intensified image and formed by the second ends (12) of the optical fibres (6) of the bundle (8), said second ends (12) being non-contiguous and fixed to a matrix output support (14), said process characterized by:

(a) forming bands (16) of optical fibres (6), whose first contiguous fibre ends (4) of the same band (16) form a line of the image to be intensified and whose second ends (12) of said same fibres (6) form the corresponding line of the intensified image;

b) collectively placing the second non-contiguous ends (12) in the matrix output support (14) positioning each second end (12) in its final position, wherein the matrix output support (14) is constituted by transparent strips which are injection molded, each strip corresponding to a band (16) and each strip having several optical blocks (32), each block having a hole (34) corresponding to a second end (12) of an optical fibre (6) in said band; and

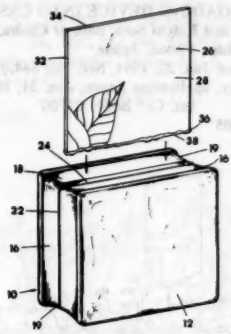
c) fixing the optical blocks (32) of each strip of the matrix output support (14) to a corresponding number of holes in a grid (30).

5,160,566

DECORATIVE GLASS BLOCK

Michael L. Ashby, and Clifford T. Ashby, both of 81 Skymountain Cir., Chico, Calif. 95928

Filed May 21, 1991, Ser. No. 703,801
Int. Cl.[5] E04C *1/42*
U.S. Cl. 156—252 10 Claims



1. A method of installing a decorative insert into a hollow, sealed glass block comprising the steps of:

mechanically removing a portion of glass of said glass block to form an elongated slot into the hollow interior of said glass block,

applying adhesive to a bottom edge of a decorative insert, said decorative insert being at least sized to fit through said slot and to span between a bottom interior surface of said glass block and edges of said glass block defining said slot,

inserting said decorative insert with said adhesive and said bottom edge first through said slot and bringing said adhesive into contact with the bottom interior surface of said glass block,

applying adhesive between an upper edge of said decorative insert and at least one adjacent edge of said glass block defining said slot,

applying adhesive over said slot so as to generally seal said slot.

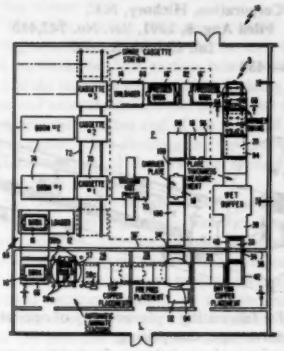
5,160,567

SYSTEM AND METHOD FOR MANUFACTURING COPPER CLAD GLASS EPOXY LAMINATES

Jiri D. Konicek; Robert P. Smith, and Jerry C. Zeroth, all of Onalaska, Wis., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Apr. 15, 1991, Ser. No. 685,337
Int. Cl.[5] B32B *31/00*
U.S. Cl. 156—288 25 Claims

15. A method of manufacturing a copper clad laminate having a B-stage substrate sheet which is an epoxy-coated web of glass cloths with at least one first sheet of copper foil respectively adhered to at least one side of the B-stage, comprising the steps of providing a plurality of press plates and a supply of copper foil within a first clean room; providing a supply of B-stage sheets in a second clean room; positioning the copper foil on at least one surface of the press plate; conveying the sandwich including the press plate and copper foil from the first clean room into the second clean room; placing a sheet of B-stage into contact with the sandwich against the copper foil side thereof; delivering the resulting laminate to a stacking station; and repeating the foregoing steps to form a stacked book of said sandwiched laminates separated from each other with said press plates; wherein said clean rooms communicate with each other through an opening through which the laminates are transferred from the first to second clean rooms, and comprising the further step of maintaining an over-pressure within the first clean room, relative to the second clean room,



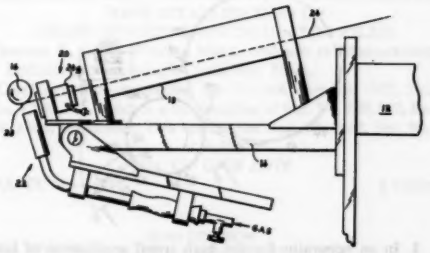
to prevent the migration of B-stage dust of fibers from the second to the first room.

5,160,568

APPARATUS INCLUDING A HEATED GUIDE EYE FOR WINDING A PLURALITY OF LENGTHS OF THERMOPLASTIC RESIN IMPREGNATED YARNS

Mark B. Gruber, New Castle, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 370,587, Jun. 14, 1989, abandoned, which is a continuation of Ser. No. 95,235, Sep. 11, 1987, abandoned. This application Feb. 1, 1991, Ser. No. 649,354
Int. Cl.[5] B65H *81/00*
U.S. Cl. 156—430 1 Claim



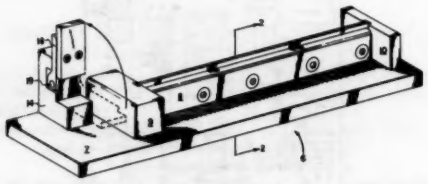
1. An apparatus for winding thermoplastic resin impregnated yarns on a rotating mandrel at speeds of 25 ft./min. and above comprising: a source of a plurality of said thermoplastic resin impregnated yarns; means for tensioning said yarns; a carriage having a circular eye guide thereon through which said yarns pass for traversing said yarns back and forth on the mandrel to wind a product; an electrically heated band heater wrapped around said guide to heat said guide to a temperature above a melt temperature but below a degradation temperature of said thermoplastic resin and means for maintaining the temperature of said resin as said thermoplastic resin impregnated yarns pass from said guide until said yarns reach said mandrel whereby the thermoplastic resin does not stick to said guide and said yarn does not fuzz after passing through said guide at winding speeds of 25 ft./min. and above.

5,160,569

TOOL FOR PREPARING OPTICAL RIBBONS

Michael J. Ott, Taylorsville; Jeffrey T. Bazemore, Hickory, both of N.C., and Mark E. Brogley, Lacey, Wash., assignors to Siecor Corporation, Hickory, N.C.

Filed Aug. 8, 1991, Ser. No. 742,415
Int. Cl.[5] B32B *5/00*
U.S. Cl. 156—439 **1 Claim**



1. A tool for fabricating a planar array of optical fibers to be held by adhesive tape, comprising:

a frame having a channel therein for holding parallel optical fibers, said channel set between a pair of rigid sidewalls extending slightly from the channel, said sidewalls being sufficiently narrow to sever adhesive tape to be placed on the optical fibers in the channel when said adhesive tape is pulled away from said sidewalls, and

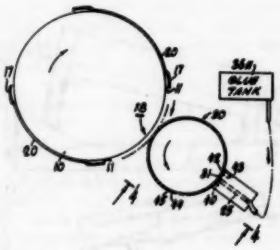
means for organizing optical fibers into a parallel array for placement into said channel.

5,160,570

ULTRA HIGH SPEED LABELING APPARATUS

Daniel M. Dickey, Denair, Calif., assignor to CMS Gilbreth Packaging Systems, Inc., Trevose, Pa.

Continuation of Ser. No. 345,447, Apr. 28, 1989, Pat. No. 5,045,140. This application May 8, 1991, Ser. No. 697,192
The portion of the term of this patent subsequent to Sep. 3, 2008, has been disclaimed.
Int. Cl.[5] B65C *9/04, 9/20*
U.S. Cl. 156—448 **7 Claims**



1. In an apparatus for the high speed application of label segments to containers with cylindrical wall portions, which includes a glue application roll having an axis of rotation and a cylindrical surface defined by a plurality of knurls having grooves therebetween for applying glue to said label segments, an improved glue supply bar having a concave surface concentric with said roll axis in close proximity and facing relation to said roll surface, comprising:

a glue supply channel terminating in a chamber within the glue bar to form an opening in the concave surface, said opening being concentric with and parallel to the glue application roll axis of rotation, said chamber having a tapered cross-sectional geometry of decreasing volume in the direction of rotation of said roll to force glue under pressure into said grooves on said roll surface, and

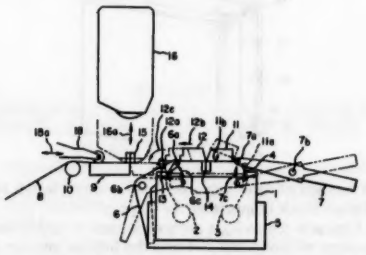
a hollow formed in the glue bar, said hollow being parallel and adjacent to said chamber similarly forming an opening in the concave bar surface said opening being concentric with and parallel to the glue application roll axis of rotation downstream of said chamber opening, the region of said bar surface located downstream of said hollow being adapted to wipe excess glue from said roll surface into said hollow for collection and removal.

5,160,571

TAPE LOADING DEVICE INTO CASSETTE

Haruo Nakano, and Koichi Sota, both of Chohu, Japan, assignors to Otari, Inc., Chohu, Japan

Filed Jan. 22, 1991, Ser. No. 644,098
Claims priority, application Japan, Jan. 31, 1990, 2-22835
Int. Cl.[5] B65H *21/00*
U.S. Cl. 156—505 **4 Claims**



1. A cassette tape loading device for winding magnetic tape around a hub provided in a cassette comprising:

cassette case holding means for holding said cassette case;

magnetic tape supply means for supplying said magnetic tape;

first splicing block means for releasably holding a leading end of said magnetic tape supplied from said magnetic tape supply means;

leader tape drawing means for drawing out a leader tape from said cassette case;

a second splicing block means for releasably holding said leader tape drawn out from said cassette case by said leader tape drawing means;

a third splicing block means for releasably holding a cut end of said leader tape or a cut end of said magnetic tape, said third splicing block means being able to selectively combine with said first splicing block means or said second splicing block means;

first cutting means for cutting said leader tape held by said second and third splicing block means, wherein said leader tape is cut by said first cutting means when said leader tape is passed through and between said second and third splicing block means when said third splicing block means combines with said second splicing block means;

a second cutting means for cutting a magnetic tape held by said first and third splicing block means, wherein said magnetic tape is cut by said second cutting means when said magnetic tape is passed through and between said first and third splicing block means when said third splicing block means combines with said first splicing block means;

a splice means for splicing the cut ends of said leader tape held by said third splicing block means and the leading end of said magnetic tape held by said first splicing block means when said third splicing block means combines with said first splicing block means;

a splicing tape pre-adhesion means for pre-adhering a splicing tape to the cut end of said magnetic tape held by said third splicing block means and to a pre-adhesion surface in a manner such that the head of said splicing tape extends out beyond the cut end of said magnetic tape;

adhesion means for joining the cut end of said leader tape held by said second splicing block means with said magnetic tape held by said third splicing block means when

said second splicing block means combines with said third splicing block means.

5,160,572

OPTICAL MEMORY DEVICE AND APPARATUS FOR MANUFACTURING THE SAME

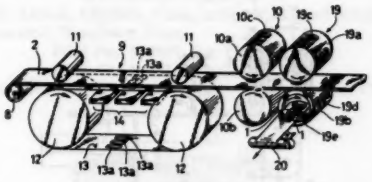
Junichiro Nakayama, Nara; Kazuhiro Kimura, Nishinomiya; Hiroyuki Katayama, and Kenji Ohta, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 374,071, Jun. 30, 1989. This application Jul. 24, 1991, Ser. No. 734,919

Claims priority, application Japan, Jul. 8, 1988, 63-171310; Jul. 8, 1988, 63-171311

Int. Cl.[5] B32B *33/00*

U.S. Cl. 156—510 **2 Claims**



1. An apparatus for manufacturing an optical memory device of a certain size, comprising supplying means for continuously supplying a sheet-like substrate, endless belt-like masking means having a plurality of windows having a size corresponding to the certain size of the optical memory device, moving means for moving both the sheet-like substrate and the endless belt-like masking means in conforming directions and at conforming speeds, recording portion forming means for forming recording portions on the substrate through the endless belt-like masking means, guide track providing means for providing along the substrate guide tracks for guiding a light beam, and cutting means for cutting the substrate to a predetermined size, wherein said moving means comprises a pair of stretching rollers for stretching the endless belt-like masking means, a plurality of pressure rollers for pressing the sheet-like substrate against the masking means on the stretching rollers, and driving means for rotating the stretching rollers and the pressure rollers.

5,160,573

TAPE CUTTER DEVICE

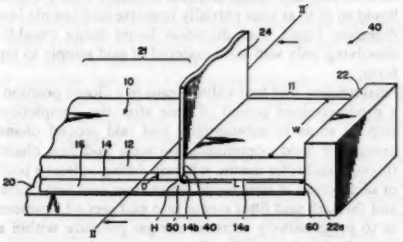
Yukihito Takagi; Teruo Imamaki, both of Kasugai; Shigeru Nakata, Nagoya, and Mikio Sakuma, Ichinomiya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Mar. 22, 1991, Ser. No. 673,338

Claims priority, application Japan, Mar. 22, 1990, 2-29501[U]

Int. Cl.[5] B32B *31/18*

U.S. Cl. 156—510 **13 Claims**



1. A tape cutter device for cutting a tape having an end and comprising a tape substrate coated with an adhesive layer and a separable sheet laid on the adhesive layer, the device comprising:

receiving means for receiving the tape such that the end of the tape is located at a first position with respect to the receiving means; and

a cutter blade for cutting the tape received on said tape receiving means to thereby divide the tape into first and second sections, the first section being defined between the end of the tape and a cut position dividing the tape into the first and second sections and the second section being defined between another end of the tape and the cut position, said cutter blade dividing the tape such that at least the adhesive layers of the first and second sections are separated from each other,

wherein the cutter blade is located at a second position with respect to the receiving means, and the distance between the first position and the second position determines lengths of the first and the second sections so that an adhesive force of the adhesive layer of each of the first and the second sections relative to the separable sheet is greater than an adhesive force of the adhesive layer of the each of the first and the second sections relative to said cutter blade.

5,160,574

PROCESS FOR PRODUCTION OF SMALL DIAMETER TITANIUM CARBIDE WHISKERS

Alan Pearson, Murrysville, and Michael A. Easley, Arnold, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed May 30, 1991, Ser. No. 707,659

Int. Cl.[5] C01B *31/30*; C30B *25/00*

U.S. Cl. 156—613 **16 Claims**

1. A method of producing titanium carbide whiskers comprising the steps of:

(a) supplying a source of materials comprised of titanium halide, hydrocarbon gas and nickel; and

(b) reacting said materials in the presence of a source of carbon monoxide to produce said titanium carbide whiskers.

5,160,575

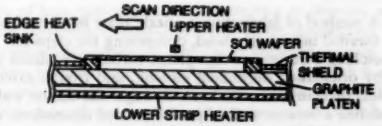
EDGE-HEAT SINK TECHNIQUE FOR ZONE MELTING RECRYSTALLIZATION OF SEMICONDUCTOR-ON-INSULATOR FILMS

Chenson K. Chen, Weston, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 124,346, Nov. 20, 1987, Pat. No. 4,889,583, which is a continuation of Ser. No. 805,117, Dec. 4, 1985, abandoned. This application Aug. 30, 1988, Ser. No. 238,311

Int. Cl.[5] C30B *13/16*

U.S. Cl. 156—620.7 **8 Claims**



1. A method for adjusting the efficiency of heat dissipation from an SOI wafer during ZMR comprising

supporting the wafer at its periphery while exposing central portions of the wafer by contacting said periphery with a solid thermally conductive substantially annular heat sink member providing a heat flow path away from said periphery, and

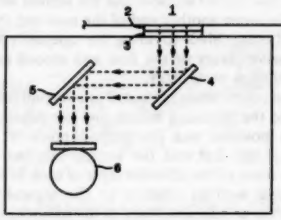
controlling the pressure of the ambient gas during ZMR to effect differential heat dissipating efficiency between the central portions and periphery of said wafer.

5,160,576

METHOD OF END POINT DETECTION IN A PLASMA ETCHING PROCESS

Michael Robbins, Bethel, Conn., assignor to Lam Research Corporation, Fremont, Calif.

Filed Mar. 5, 1991, Ser. No. 664,826
Int. Cl.[5] G01N *21/00*
U.S. Cl. 156—626 **22 Claims**



1. A method of end-point detection in a plasma etching process, comprising:

etching a specimen by means of glow discharge in a reaction chamber; and

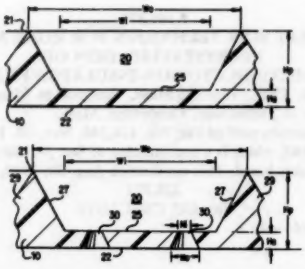
optically detecting an intensity of at least one emission peak in emission spectrum of radiation from the glow discharge, the emission spectrum being reflected from at least one rugate filter prior to measuring the intensity of the emission peak in the emission spectrum.

5,160,577

METHOD OF FABRICATING AN APERTURE PLATE FOR A ROOF-SHOOTER TYPE PRINTHEAD

Narayan V. Deshpande, 101 Highledge Dr., Penfield, N.Y. 14526

Filed Jul. 30, 1991, Ser. No. 738,015
Int. Cl.[5] H01L *21/306*; B44C *1/22*
U.S. Cl. 156—644 **9 Claims**



1. A method of fabricating a nozzle plate for a roofshooter type thermal ink jet printhead, comprising the steps of:

a) etching a trough in a first planar surface of a silicon wafer by orientation dependent etching, said trough extending less than an entire thickness through said silicon wafer to define a bottom wall of predetermined dimensions, a distance between said bottom wall and a second planar surface, opposite from said first planar surface of said silicon wafer, defining a thickness of a nozzle containing portion of said nozzle plate;

b) placing an etch resistant mask on said second planar surface, said mask comprising a pattern defining a plurality of apertures thereon; and

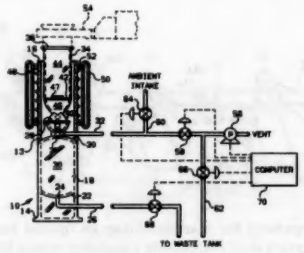
c) etching a plurality of nozzle defining apertures from said second planar surface between said bottom wall and said second planar surface of said silicon wafer by orientation dependent etching, said plurality of nozzle defining apertures being defined within the predetermined dimensions of said bottom wall, said etching of said plurality of nozzles being a distinct, separate etching step from the etching which forms said trough.

5,160,578

SEPARATING OF FIBERS FROM A FIBER-CONTAINING SOLID SAMPLE

Ronald D. Jones, and Joseph B. Cross, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 23, 1990, Ser. No. 513,397
Int. Cl.[5] G01N *1/10*
U.S. Cl. 156—655 **11 Claims**



1. A method for separating fibers from a solid sample which comprises a solid material having fibers embedded therein, said method comprising:

(a) providing a first vessel having an interior surface and a filter means with opposing surfaces mounted therein so as to extend across the interior of said first vessel such that said filter means contacts said interior surface around the circumference of said filter means, wherein a first chamber for receiving said sample is defined within said first vessel by said interior surface and one of the opposing surfaces of said filter means, and wherein said filter means is adapted to receive liquid but not fibers therethrough;

(b) providing a second vessel having an interior surface defining a second chamber therein and also having an upper end and a lower end;

(c) providing a first conduit means having an open end in fluid communication with said second chamber at a position above the lower end of said second vessel;

(d) providing a first valve means associated with said first conduit means, wherein said first valve means has an open position and a closed position;

(e) robotically positioning said first vessel upon the upper end of said second vessel so that said first chamber is positioned above said second chamber and so that said filter means is positioned between said first and second chambers to provide fluid communication through said filter means between said first and second chambers;

(f) at least partially filling said first chamber with a digestion liquid so as to at least partially immerse said sample in said digestion liquid, said digestion liquid being capable of dissolving only said solid material of said sample to liquid form;

(g) maintaining said first valve means in a closed position for a predetermined period of time after the completion of step (f) so as to substantially seal said second chamber except for fluid communication with said first chamber through said filter means, wherein during at least a portion of said period of time liquid flows from said first chamber and through said filter means into said second chamber so as to progressively increase the gas pressure within said second chamber to thereby progressively decrease the flow of liquid into said second chamber, and further wherein at the completion of this step the liquid level in

said second chamber is below the position of the open end of said first conduit means;

(h) opening said first valve means immediately after the completion of step (g);

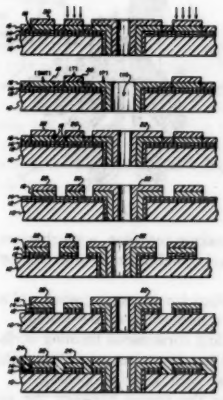
(i) withdrawing at least a portion of the gaseous contents of said second chamber through said first conduit means and said first valve means after step (h) so as to reduce the gas pressure in said second chamber sufficiently so that a substantial portion of liquid remaining in said first chamber after step (g) flows through said filter means and into said second chamber.

5,160,579

PROCESS FOR MANUFACTURING PRINTED CIRCUIT EMPLOYING SELECTIVE PROVISION OF SOLDERABLE COATING

Gary B. Larson, Cheshire, Conn., assignor to MacDermid, Incorporated, Waterbury, Conn.

Filed Jun. 5, 1991, Ser. No. 710,779
Int. Cl.[5] B44C 1/22; C23F 1/00
U.S. Cl. 156—661.1 **9 Claims**



1. A process for fabricating a printed circuit in which selected conductive areas, including through-holes and surrounding pads, are selectively provided with a solderable metal coating which maintains and promotes the solderability of electrical components thereat, said process comprising the steps of:

(a) providing a printed circuit material comprised of a metallized insulating substrate material having through-holes formed therein;

(b) metallizing the surfaces of said through-holes;

(c) providing on said printed circuit material a primary plating resist in the negative of the pattern of desired conductive circuitry of said printed circuit;

(d) thereafter providing additional metal over those metallized areas of the printed circuit material not covered by said primary plating resist;

(e) thereafter selectively electrophoretically applying, over those areas of said printed circuit material provided with said additional metal, a photoimageable electrophoretically depositable organic resin;

(f) thereafter imagewise exposing and developing said photoimageable electrophoretically applied resin to provide a pattern of a second resist on said printed circuit material, said pattern of said second resist being such that, of all conductive areas, only the selected conductive areas, including through-holes and surrounding pads, which are to be provided with a solderable metal coating, remain exposed;

(g) thereafter selectively providing a solderable metal coating only on said exposed conductive areas;

(h) thereafter selectively removing said primary plating resist from said printed circuit material;

(i) thereafter etching away metal which was under said primary plating resist; and

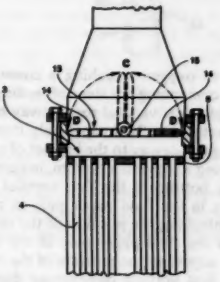
(j) thereafter removing said second resist from said printed circuit material.

5,160,580

PROCESS OF USING A MULTI-PURPOSE TUBE NEST EVAPORATOR

Carlo Sassi, Parma, Italy, assignor to Fenco S.p.A., Parma, Italy

Continuation of Ser. No. 185,339, Apr. 21, 1988, abandoned, which is a continuation of Ser. No. 890,942, Jul. 28, 1986, abandoned. This application Jan. 3, 1990, Ser. No. 464,623
Claims priority, application Italy, Jul. 31, 1985, 40081 A/85
Int. Cl.[5] B01D 1/06, 1/30
U.S. Cl. 159—47.1 **8 Claims**



1. A process for establishing one of two modes of operation of an evaporator, said process comprising using an evaporator including:

a generally tubular jacket;

two independent circulation circuits, one providing a force feed mode of operation and the other providing a cascade mode of operation, for introducing two different products of different viscosity into the evaporator;

and a plurality of nested heat exchange tubes disposed about a generally vertical axis and mounted within the jacket;

providing a single movable baffle;

permanently mounting said baffle on an axis generally perpendicular to the axes of the tubes at an end of said plurality of heat exchange tubes for selective movement, without evaporator, shut-down for baffle dismantling and reassembly operations, alternately between a force feed flow position where the baffle extends parallel to said plurality of heat exchange tubes for one product flow therethrough and a cascade flow position where the baffle is positioned perpendicular to the vertical heat exchange tubes for another product flow therethrough;

selectively moving the baffle according to product viscosity about said axis between the cascade flow position and the force feed flow position so as to establish a cascade mode of operation where the flow of product must be controlled or back to the force feed flow position to establish a force feed mode of operation where no control of product flow is required; said selective movement being effected automatically; and,

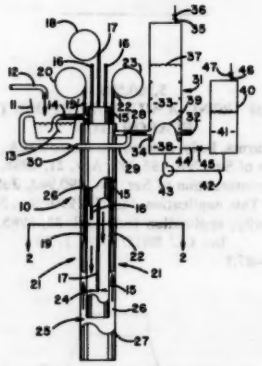
bypassing one circulation circuit when the other is in use.

5,160,581

METHOD FOR OXYGEN BLEACHING PAPER PULP

James A. Titmas, Kent, Ohio, assignor to Titmas and Associates Incorporated and Waste Safety International, Inc., Hudson, Ohio

Filed Jun. 1, 1990, Ser. No. 531,551
Int. Cl.[5] D21C 9/147
U.S. Cl. 162—61 7 Claims



1. A method of oxygen bleaching a continuously flowing fluid paper pulp comprising the steps of feeding the fluid paper pulp to the top of a first vertical passageway having a top and a bottom, conducting the fluid paper pulp from the bottom of the first vertical passageway to the bottom of a second vertical passageway having a top and a bottom, initiating a reaction in a zone near the bottom of the first vertical passageway by injecting oxygen in the fluid paper pulp in the first vertical passageway, controlling the position of the reaction zone and the flow rate of the fluid paper pulp in the first and second passageways by adjusting the position of the injection of oxygen within the first vertical passageway during the oxygen bleaching, and removing the fluid paper pulp treated in the reaction zone from the top of the second vertical passageway, wherein the rate of flow of the processed fluid away from the apparatus is controlled independently of the rate of flow of the fluid paper pulp in the first and second passageways, and both rates of flow are managed without the benefit of pumps or flow restricting valves.

5,160,582

CELLULOSE-BASED, INFLAMMABLE, BULKY PROCESSED SHEETS AND METHOD FOR MAKING SUCH SHEETS

Ryoji Takahashi, Tokyo, Japan, assignor to Chisso Corporation, Osaka, Japan

Filed May 8, 1990, Ser. No. 520,380
Claims priority, application Japan, Jun. 7, 1989, 1-144969; Jun. 8, 1989, 1-145774; Jun. 8, 1989, 1-145775; Jun. 9, 1989, 1-147662
Int. Cl.[5] D21H 11/20
U.S. Cl. 162—117 18 Claims

1. A method for making a bulky processed sheet or mat which method consists essentially of the steps of

(a) producing a crosslinked cellulose pulp by treating a cellulose pulp with 2–50% by weight, based on the weight of the cellulose pulp, of a crosslinking agent,

(b) breaking up the crosslinked cellulose pulp into a bulky mass of smaller crosslinked cellulose fibers, this bulky mass having a thickness measured under load-free conditions which was 8–14 times greater than that of a sheet which had been treated in the same manner as described above but without the use of a crosslinking agent,

(c) mixing the bulky mass of smaller crosslinked cellulose fibers with 1–50% by weight of a fibrous binder selected from the group consisting of (1) fibers that are soluble in hot water and (2) thermally fusible fibers,

(d) forming the mixture resulting from step (c) into a bulky sheet and subjecting the sheet in a wet state to a hot pressing treatment,

(e) drying said hot pressed sheet, and

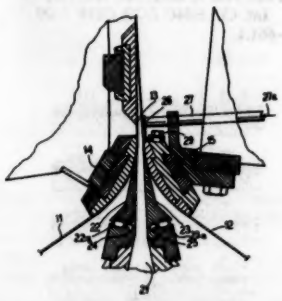
(f) embossing the dried sheet under heating conditions.

5,160,583

CONTROLLED JET INJECTION APPARATUS FOR A PAPERMAKING MACHINE HEADBOX

Daniel J. Eaton, and Roger A. Kanitz, both of Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis.

Filed Dec. 2, 1991, Ser. No. 801,283
Int. Cl.[5] D21F 1/00
U.S. Cl. 162—301 3 Claims



1. In a papermaking machine, a mechanism for delivering stock to a dewatering web forming zone comprising, in combination:

a pressure headbox for containing stock and having pondside sealing, and a narrowing slice opening;

opposed traveling foraminous forming surfaces comprising twin looped forming wires providing a throat in substantial alignment with the slice opening;

means bridging the spaces between the opening and the forming surfaces so that a stock jet is contained in movement from the opening to the forming surface absent a free surface of the stock;

and control means for controlling the space between said forming surfaces in the throat, the control means including a flexible trailing slice lip structured and arranged to control cross machine weight profile and in engagement with the underside of one of the opposed traveling forming surfaces.

5,160,584

HIGH CONSISTENCY SHEET FORMER

Borje Fredriksson, Sundsvall, Sweden, assignor to Beloit Technologies, Inc., Wilmington, Del.

Continuation of Ser. No. 421,047, Oct. 12, 1989, abandoned.
This application May 28, 1991, Ser. No. 707,429
Int. Cl.[5] D21F 1/02, 1/08
U.S. Cl. 162—318 7 Claims

1. A barrier former comprising:

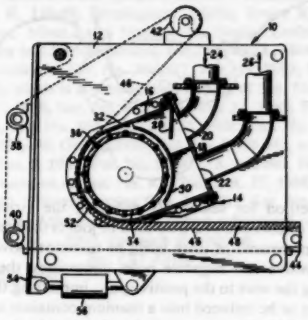
chamber means defining a chamber and including a slurry inlet for receiving a flow of fiber slurry under pressure and a perforate arcuate barrier wall including a plurality of discrete screen-like openings for distributing the fiber slurry therethrough;

rotor means including a rotor mounted for rotation adjacent and closely spaced from said arcuate barrier wall and forming a gap therebetween for receiving the slurry, said

rotor creating turbulence in the slurry adjacent the barrier wall to provide defloculation at high consistency;

a plurality of spaced rolls and drive means for driving at least one of said rolls;

a collecting wire entrained about said plurality of rolls and at least partially about said perforate arcuate barrier wall for receiving the distributed fiber slurry to form a web, and



a forming zone defined by an area of said perforate arcuate barrier and said collecting wire entrained there about;

an initial dewatering means associated with said forming zone including a pressure fed area of said forming zone and tensioning means for said collecting wire counteracting slurry pressure in said pressure fed area to begin immediate dewatering by controlling drainage from said web within said forming zone.

5,160,585

SEPARATION OF TETRACHLOROETHYLENE FROM A BUTYL ALCOHOL BY EXTRACTIVE DISTILLATION

Lloyd Berg, 1314 S. 3rd Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Filed Jul. 23, 1991, Ser. No. 734,606

Int. Cl.[5] B01D *3/40*; C07C *17/38, 29/84*

U.S. Cl. 203—57 **5 Claims**

1. A method for recovering tetrachloroethylene from a mixture of tetrachloroethylene and n-butanol which comprises distilling a mixture of tetrachloroethylene and n-butanol in the presence of about one part of an extractive agent per part of tetrachloroethylene-n-butanol mixture, recovering the tetrachloroethylene as overhead product and obtaining the n-butanol and the extractive agent from the stillpot, wherein said extractive agent consists of one material selected from the group consisting of diethylene glycol ethyl ether, 1-methoxy-2-propanol, ethyl 3-ethoxypropionate, butoxypropanol, dipropylene glycol methyl ether, diethylene glycol methyl ether, 1-methoxy-2-propanol acetate, ethylene glycol butyl ether, ethylene glycol methyl ether, ethylene glycol ethyl ether, diethylene glycol butyl ether, propylene glycol methyl ether, propylene glycol isobutyl ether, ethylene glycol phenyl ether, 4-methoxy-4-methyl pentanone-2, propoxypropanol and mesityl oxide.

5,160,586

OZONE DECOMPOSING REACTOR

Masafumi Yoshimoto; Tadao Nakatsuji; Kazuhiko Nagano, and Tetsuo Tatsu, all of Osaka, Japan, assignors to Sakai Chemical Industry Co., Ltd., Osaka, Japan

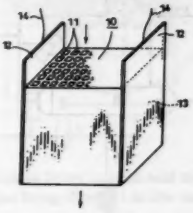
Filed May 21, 1990, Ser. No. 525,597

Claims priority, application Japan, May 19, 1989, 1-127528; Jun. 6, 1989, 1-143380; Dec. 12, 1989, 1-322374

The portion of the term of this patent subsequent to Oct. 27, 2009, has been disclaimed.

Int. Cl.[5] C25B *1/00, 9/00*; C25F *5/00*

U.S. Cl. 204—59 R **14 Claims**



12. A method of decomposing ozone contained in a waste gas with a catalyst structure composed of a carrier of a fibers board having at least one passage extending therethrough for allowing an ozone containing waste gas to pass through the catalyst structure, and a catalyst having catalystic ozone decomposition activity in an amount effective to render the carrier active for ozone decomposition and an electroconductive material in the form of powder, fibers or whiskers in an amount of 30–50% by weight based on the fiber board so that the catalyst structure generates heat when electric current is applied thereto, said catalyst and electroconductive material being carried in or on the carrier, which comprises: passing the waste gas through the passage while electrifying and heating the catalyst structure, thereby to decompose ozone at elevated temperatures.

5,160,587

EXTRACTIVE DISTILLATION OF PROPYLENE OXIDE

Edward T. Marquis; George P. Speranza; Yu-Hwa E. Sheu; William K. Culbreth, III, and David G. Pottratz, all of Austin, Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Nov. 1, 1991, Ser. No. 786,856

Int. Cl.[5] B01D *3/40*; C07D *301/32*

U.S. Cl. 203—64 **3 Claims**

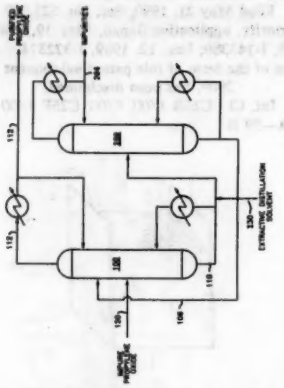
1. An extractive distillation process for the distillation of an impure propylene oxide feedstock in a distillation column to remove oxygenated contaminants, including water, methanol, and acetone from the impure propylene oxide feedstock which comprises the steps of:

introducing said impure propylene oxide feedstock into said distillation column at a feed point in the lower half of said distillation column, said impure propylene oxide feedstock comprising propylene oxide contaminated with from about 0.01 to about 2 wt. % of water, from about 50 to about 4000 of methanol and from about 0.01 to about 2 wt. % of acetone,

introducing an extractive distillation agent consisting essentially of dipropylene glycol into said distillation column at a feed point above the said impure propylene oxide feed point, said extractive distillation agent being introduced into said distillation column in the ratio of said impure propylene oxide feedstock to said extractive distillation agent of from about 1:1 to about 20:1,

withdrawing an overhead distillate fraction from said distillation column consisting essentially of essentially anhy-

drous propylene oxide contaminated with reduced quantities of acetone and methanol,



withdrawing a bottoms distillation fraction from said distillation column containing substantially all of the dipropylene glycol, water and acetone.

5,160,588

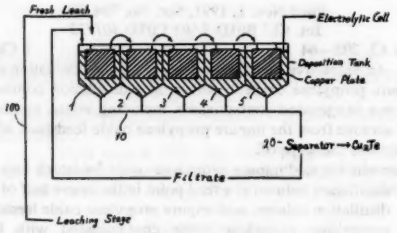
PROCESS FOR RECOVERING TELLURIUM FROM COPPER ELECTROLYSIS SLIME

Yukio Sugawara, Iwaki; Mineo Hayashi, Ote; Junji Konishi, Tokyo, and Shosaku Hayashi, Iwaki, all of Japan, assignors to Mitsubishi Materials Corporation and Onahama Smelting and Refining Company, Ltd., both of Tokyo, Japan

Filed Dec. 1, 1989, Ser. No. 444,676

Int. Cl.[5] C25C *1/22*

U.S. Cl. 204—109 **7 Claims**



1. In the process for recovering tellurium from copper electrolysis slime comprising leaching copper and tellurium from said slime with sulfuric acid and recovering tellurium from the solution containing copper and tellurium sulfate after leaching as copper telluride, an improved process comprising suspending at least one copper electrode plate in a bath of said solution, allowing tellurium to deposit on the surface thereof as copper telluride, agitating the bath as required so as to remove the copper telluride formed on the surface of the copper plate with an alternating electric current and allowing said copper telluride to settle, collecting the copper telluride precipitate, and converting said precipitate to tellurium.

5,160,589

PROCEDURE FOR THE REDUCTION OF THE CROSS-SECTION OF A WIRE

Michelangelo Gionfriddo, 57 Via Fusinato, Padua, Italy

Filed Jun. 13, 1991, Ser. No. 713,373

Int. Cl.[5] C25F *3/06*

U.S. Cl. 204—129.1 **3 Claims**

1. A method for selectively reducing the cross-sectional dimension of portions of a wire used to join orthodontic brackets for displacement of teeth using an electrical power source having positive and negative poles comprising the steps of: connecting the wire to the positive pole, immersing the portion of the wire to be reduced into a titanium container containing a solution of highly concentrated orthophosphoric acid, connecting the negative pole of the electrical power source to the container, and applying a low intensity electric current between the two poles.

5,160,590

ELECTROLYTIC PROCESSING METHOD FOR ELECTROLYTICALLY PROCESSING METAL SURFACE

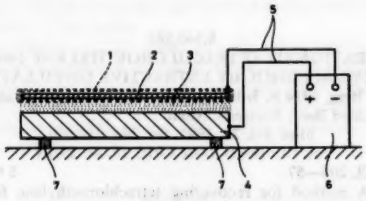
Nobuo Totsuka; Mitsuo Kimura; Takao Kurisu; Yuji Mishiro; Masakazu Sengan, all of Chiba; Katsunobu Ishizawa, Tokyo; Shigemitsu Kashihara, Tokyo; Minoru Kanazawa, Tokyo, and Nagahiro Komatu, Tokyo, all of Japan, assignors to Kawasaki Steel Corp. and San-ai Oil Co. Ltd., Japan

Continuation of Ser. No. 403,766, Sep. 6, 1989, abandoned. This application Oct. 3, 1991, Ser. No. 770,715

The portion of the term of this patent subsequent to Mar. 5, 2008, has been disclaimed.

Int. Cl.[5] C25D *5/02, 17/00*

U.S. Cl. 204—141.5 **12 Claims**



1. An electrolytic processing method for electrolytically processing the surface of a metallic member without requiring the use of any electrolytic solution tank, comprising the steps of:

preparing an electrically conductive paste containing an electrolyte and having a viscosity in the range of 1,000–100,000 cp;

placing said paste having said viscosity between said metallic member and an opposing electrode; said paste being a spreadable non-liquid material wherein said viscosity is sufficient to maintain it supported between the electrode and said metallic member without any other support; said paste extending continuously conductively between said metallic member and said opposite electrode; and

causing an effective amount of an electrical current to flow between said metallic member and said opposing elec-

trode through said paste to perform the electrolytic process.

5,160,591

METHODS AND APPARATUS FOR REGULATING TRANSMEMBRANE ION MOVEMENT UTILIZING SELECTIVE HARMONIC FREQUENCIES AND SIMULTANEOUS MULTIPLE ION REGULATION

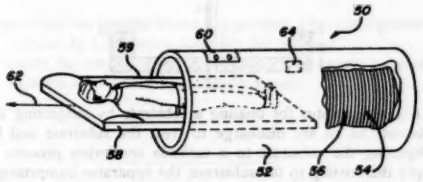
Abraham R. Liboff, Birmingham, Mich.; Bruce R. McLeod, Bozeman, Mont., and Stephen D. Smith, Lexington, Ky., assignors to Life Resonances, Inc., Bozeman, Mont.

Continuation of Ser. No. 343,017, Apr. 25, 1989, Pat. No. 5,073,238, which is a continuation-in-part of Ser. No. 280,848, Dec. 7, 1988, Ser. No. 172,268, Mar. 23, 1988, Pat. No. 4,932,951, Ser. No. 265,265, Oct. 31, 1988, Pat. No. 5,067,940, Ser. No. 254,438, Oct. 6, 1988, Pat. No. 5,106,361, and Ser. No. 295,164, Jan. 9, 1989, Pat. No. 5,100,373, said Ser. No. 280,848, is a continuation of Ser. No. 923,760, Oct. 27, 1988, Pat. No. 4,818,697. This application Oct. 25, 1991, Ser. No. 764,666

The portion of the term of this patent subsequent to Jun. 12, 2007, has been disclaimed.

Int. Cl.[5] A61N *2/04*

U.S. Cl. 204—155 **1 Claim**



1. A method for controlling tissue growth, comprising:

providing a pair of opposed coils and means for electrically energizing said coils;

providing a human subject in an ambient magnetic field;

generating an oscillating applied magnetic field along an axis projecting through a region of a human subject by producing an offset sinusoidal signal from said electrical energy source and energizing said coils with said offset sinusoidal signal, said applied magnetic field combining with a component of said ambient field along said axis to form an oscillating magnetic field along said axis having a non-zero net average value;

creating and maintaining a ratio between the frequency of said oscillating magnetic field and said net non-zero average value of said magnetic field by selecting a frequency of said oscillating magnetic field which is equal to $XBq/2\pi m$, where B is said net non-zero average value, q is the charge of an ion in Coulombs, m is the mass of said ion in kilograms, X is an odd integer greater than 1 and frequency is in Hertz.

5,160,592

METHOD FOR TREATMENT OF MOVING SUBSTRATE BY ELECTRIC DISCHARGE PLASMA AND DEVICE THEREFOR

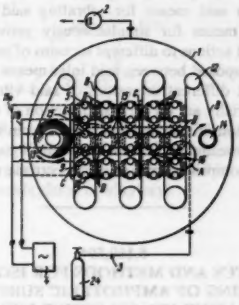
Valentin M. Spitsin; Evgeny V. Karetnikov; Sergei F. Grishin; Andrei A. Ivanov, and Boris L. Gorberg, all of Ivanovo, U.S.S.R., assignors to Ivanovsky Nauchno-Issledovatelsky Experimentalno-Konstruktorsky Institut, Ivanovo, U.S.S.R.

Filed May 31, 1991, Ser. No. 708,455

Int. Cl.[5] B01J *19/08*; B05D *3/14*; H05F *3/04*

U.S. Cl. 204—164 **3 Claims**

1. A method for treatment of a moving substrate by electric discharge plasma, comprising the steps of continuously moving the substrate, producing a plurality of zones of treatment by plasma flows along said moving substrate, said substrate moving through said zones in a loop-like fashion; producing plasma flows in each said treatment zone parallel to said moving substrate as individual regions with gaps therebetween; supplying a plasma-forming gas into said gaps between adjacent regions of plasma flows in each said treatment zone, said plasma-forming gas being directed to the surface of said moving substrate.



5,160,593

APPARATUS AND METHOD FOR REMOVING LIQUID FROM LIQUID BEARING MATERIAL

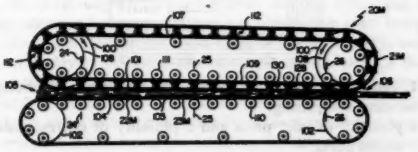
James T. Candor, 5440 Cynthia La., Dayton, Ohio 45429

Continuation-in-part of Ser. No. 695,603, May 3, 1991, abandoned, which is a continuation-in-part of Ser. No. 575,416, Aug. 29, 1990, Pat. No. 5,114,553, and Ser. No. 502,506, Mar. 30, 1990, Pat. No. 5,019,230, which is a continuation-in-part of Ser. No. 454,718, Dec. 21, 1989, Pat. No. 4,975,166, said Ser. No. 575,416, is a division of Ser. No. 454,718, , which is a continuation-in-part of Ser. No. 386,579, Jul. 27, 1989, abandoned, which is a continuation-in-part of Ser. No. 284,197, Dec. 14, 1988, Pat. No. 4,877,503, which is a continuation-in-part of Ser. No. 213,709, Jun. 30, 1988, abandoned, which is a continuation-in-part of Ser. No. 189,974, May 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 62,201, Jun. 15, 1987, Pat. No. 4,780,188, which is a continuation-in-part of Ser. No. 32,746, Mar. 31, 1987, Pat. No. 4,767,514. This application Jul. 17, 1991, Ser. No. 731,791

The portion of the term of this patent subsequent to May 15, 2009, has been disclaimed.

Int. Cl.[5] B01D *57/02*

U.S. Cl. 204—180.1 **20 Claims**



1. In an apparatus for removing liquid from liquid bearing material and comprising a pair of electrode means having portions thereof disposed adjacent each other and defining an inlet means to said adjacent portions and an outlet means from said adjacent portions, means for feeding said liquid bearing material into said inlet means, means for moving said liquid bearing material from said inlet means to said outlet means so that sections of said material serially move from said inlet means to said outlet means while being disposed between said adjacent portions, means for vibrating said liquid bearing material between said adjacent portions of said electrode means as said material is moving from said inlet means to said outlet means whereby a vibratory field arrangement is applied to said

material, and means for creating a voltage between said pair of electrode means so as to create an electrostatic field arrangement between said adjacent portions of said pair of electrode means for acting through said material that is disposed therebetween to remove liquid from that said material, the improvement wherein said means for vibrating said liquid bearing material has means for simultaneously providing different vibratory field actions to different sections of said material that are serially disposed between said inlet means and said outlet means so that different intensities of said vibratory field arrangement serially act on each said section of said material as each said section of said material moves from said inlet means to said outlet means, said means for vibrating said liquid bearing material comprising one of said electrode means.

5,160,594

APPARATUS AND METHODS FOR ISOELECTRIC FOCUSING OF AMPHOTERIC SUBSTANCES INCORPORATING ION SELECTIVE MEMBRANES IN ELECTRODE CHAMBERS

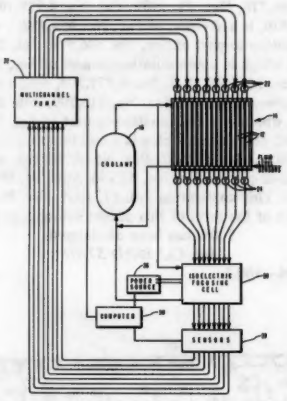
G. David Huff, and L. Scott Rodkey, both of Houston, Tex., assignors to Board of Regents of the University of Texas System, Austin and Ampholife Technologies, Inc., The Woodlands, both of, Tex.

Continuation-in-part of Ser. No. 320,725, Mar. 8, 1989, Pat. No. 4,963,236. This application May 18, 1990, Ser. No. 525,558

The portion of the term of this patent subsequent to Oct. 16, 2007, has been disclaimed.

Int. Cl.[5] G01N *27/26*

U.S. Cl. 204—182.9 **26 Claims**



1. An isoelectric focusing cell for separating amphoteric substances comprising:

a plurality of inlet ports and a plurality of corresponding outlet ports;

means for separating the flow of fluid which enters the isoelectric focusing cell through the inlet ports into a plurality of parallel focusing cell passageways such that fluid flowing through the inlet ports is channeled to corresponding outlet ports of each focusing cell passageway;

an anode located within an anode chamber and a cathode located within a cathode chamber, said anode and said cathode being capable of applying an electric potential substantially transverse to the plurality of parallel focusing cell passageways; and

means for minimizing both positive and negative ions contained within the anode chamber and within the cathode chamber from passing into the focusing cell passageways.

5,160,595

ARC-MAGNETRON AND THE METHOD OF COATING

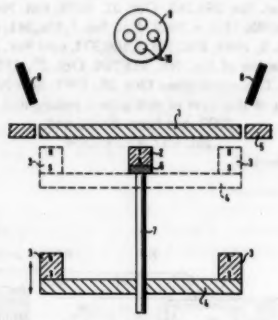
Fransiscus J. M. Hauzer, Velden; Wolf-Dieter Münz, Venlo; Boudewijn J. A. M. Buil, Belfeld, all of Netherlands; Dietmar Schulze, Dresden, Fed. Rep. of Germany, and Roel Tietema, Venlo, Netherlands, assignors to Hauzer Holding B.V., Venlo, Netherlands

Filed May 16, 1991, Ser. No. 701,388

Claims priority, application European Pat. Off., Apr. 19, 1987, 91106331.1; Fed. Rep. of Germany, May 28, 1990, 4017111

Int. Cl.[5] C23C *14/34*

U.S. Cl. 204—192.38 **16 Claims**



1. An apparatus for coating a substrate by subjecting the substrate to an arc discharge to treat the substrate and by subjecting the substrate to a cathode sputtering process to apply the coating to the substrate, the apparatus comprising

an evacuatable chamber the chamber including at least one target, and an anode;

first means for subjecting the substrate to an arc discharge process;

second means for subjecting the substrate to a cathode sputtering process;

a magnet arrangement for each target comprising a center pole permanent magnet and oppositely poled permanent edge magnets laterally spaced from the center pole permanent magnet; and

means for changing the position of the magnet arrangement for each target relative to the target so that, in a first position of the magnet arrangement adjacent the target, a magnetic field is generated in the target region which enables the second means to make the cathode sputtering process possible and, in a second position of the magnet arrangement remote from the target, a magnetic field is generated which enables the first means to make the arc discharge process possible.

5,160,596

MEMBRANELESS CHLORINE GAS GENERATING APPARATUS

R. Davidson Keller, Jr., 1870 Oak Creek Dr., Dunedin, Fla. 34698

Continuation-in-part of Ser. No. 662,922, Mar. 1, 1991, abandoned. This application Aug. 7, 1991, Ser. No. 741,631

Int. Cl.[5] C25B *9/00, 11/10, 11/12, 15/08*

U.S. Cl. 204—266 **15 Claims**

1. An apparatus for electrolytically generating a halogen gas from a brine solution located in a cell comprising

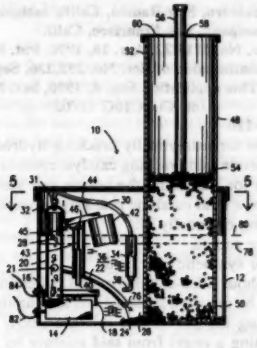
an anode located below a top surface of a hood, the hood adapted to define a portion of a boundary between a caustic and brine solution interface,

a cathode adapted to be located in close vertical proximity above the caustic and brine solution interface,

the hood for collecting halogen gas positioned over the

anode, the hood leading upwardly to a halogen gas separator column,

a salt storage compartment open at a first and second end, the first lower end adapted to open above the brine solution in the cell, the second upper end being open to allow filling of the compartment with salt,



a gas tight tue leading from a top portion of the gas separator column to a receiving body for the gas, and

a means for sensing when the density of the caustic solution exceeds a predetermined density figure.

5,160,597

SENSOR WITH ANTIGEN CHEMICALLY BONDED TO A SEMICONDUCTOR DEVICE

Claudio Colapicchioni; Filippo Porcelli, and Carlo A. Nuzzolo, all of Rome, Italy, assignors to Eniricerche S.p.A., Milan, Italy

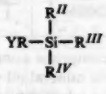
Filed Apr. 12, 1990, Ser. No. 507,994

Claims priority, application Italy, Apr. 21, 1989, 20259 A/89

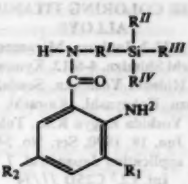
Int. Cl.[5] G01N *27/26*

U.S. Cl. 204—403 **2 Claims**

1. A sensor constructed of an imunochemical membrane adhering to a silicon oxide surface of an electrolyte oxide semiconductor or a chemical field effect transistor through a polysiloxane matrix, said imunochemical membrane formed from a monolayer consisting of a functionalized antigen or a polymeric multilayer consisting of a functionalized antigen and a protein, said imunochemical membrane being directly bonded chemically to the polysiloxane matrix by functional groups present on the said antigen or by bifunctional coupling agents present on said protein and the polysiloxane matrix being chosen from organosilanes of the formula:



wherein R^{II}, R^{III} and R^{IV}, which may be the same or different, are each C_{1-10} alkyl or alkoxy, R is $(CH_2)_mX(CH_2)_n$, wherein X is CH_2 or a mono- or polycondensed aromatic group, NH or O; m and n, which are equal or different, are each 0–10, but not 0 when X is NH or O; Y is $—NH_2$, —OH or —SH; or from functional organosilanes of the formula:



wherein R_1 and R_2, which are the same or different, are Cl, Br, CH_3, NO_2, NH_2 or H; R^{II}, R^{III} and R^{IV}, which are the same or different, are C_{1-10} alkyl or alkoxy groups and R^I is C_{1-10} alkyl, aminoalkyl, aminoalkylaryl or alkylaryl.

5,160,598

OXYGEN SENSOR FOR AIR-FUEL RATIO CONTROL HAVING A PROTECTIVE LAYER INCLUDING AN OXYGEN STORAGE MATERIAL

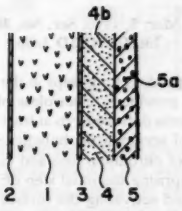
Toshiki Sawada; Masaru Yamano; Taguchi Kazuo; Takao Kojima; Hiroyuki Ishiguro, and Masahiko Yamada, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Feb. 14, 1990, Ser. No. 479,695

Claims priority, application Japan, Feb. 14, 1989, 1-32603; Feb. 14, 1989, 1-32604; Feb. 14, 1989, 1-32605

Int. Cl.[5] G01N *27/58*

U.S. Cl. 204—429 **38 Claims**



1. An oxygen sensor for air-fuel ratio control, comprising a sensor element having an oxygen-ion conductive main body and electrodes disposed on both sides of the main body, and protective layers covering the electrode on the side of the sensor element assigned to be exposed to a gas to be measured

wherein the protective layers comprise a first protective layer and a second protective layer, each made of a heat-resistant metal oxide provided on the side of the sensor element assigned to be exposed to the gas to be measured, the first protective layer being disposed closer to the electrode than the second protective layer,

wherein either one of the first and second protective layers includes a noble metal catalyst,

wherein the other one of the first and second protective layers includes an oxygen storage component without substantial copresence of the noble metal catalyst, and

wherein the main body of the sensor element comprises a base portion and a portion with a plurality of spherical protrusions, the first protective layer being intermeshingly connected to the base portion via the spherical protrusions.

5,160,599
PROCESS FOR COLORING TITANIUM AND ITS ALLOYS

Kenzo Kobayashi, 1-33-3, Inukura, Miyamae-ku, Kawasaki-shi, Kanagawa; Kenichi Shimizu, 4-6-12, Kyouwa, Sagamihara-shi, Kanagawa, and Hideaki Yoshioka, Sendai, all of Japan, assignors to Kenzo Kobayashi, Kawashi; Kenichi Shimizu, Sagamihara and Yoshida Kogyo K.K., Tokyo, all of, Japan

Filed Jun. 19, 1990, Ser. No. 540,150

Claims priority, application Japan, Jul. 7, 1989, 1-174286

Int. Cl.[5] C25D *11/34*

U.S. Cl. 205—106 **10 Claims**

1. A process for coloring a metal selected from the group consisting of titanium and a titanium-containing alloy, comprising the steps of:

in a first anodizing step, anodizing said metal in an aqueous electrolytic solution at a constant current density and thereby progressively increasing the first anodizing voltage to a first level which is at least as high as the level at which oxygen evolution begins in the aqueous electrolytic solution;

then interrupting the supply of current and discontinuing said first anodizing step;

then in a second anodizing step, further anodizing said metal in an aqueous electrolytic solution at a constant current density and thereby progressively increasing the second anodizing voltage to a constant second anodizing voltage which is lower then said first level of said first anodizing voltage, and continuing the second anodizing step while maintaining the second anodizing voltage constant for a period of time effective to form an oxide film of the desired color on said metal.

5,160,600
CHROMIC ACID FREE ETCHING OF POLYMERS FOR ELECTROLESS PLATING

Gordhanbai N. Patel, 133 Walnut Ave., Somerset, N.J. 08873; Durgadas Bolikal, 817-A, Donaldson St., Highland Park, N.J. 08904, and Hemant H. Patel, 4804 Hana Rd., Edison, N.J. 08817

Filed Mar. 5, 1990, Ser. No. 488,256

Int. Cl.[5] C25D *5/56*

U.S. Cl. 205—169 **27 Claims**

1. In the etching and wetting steps in the process of electrolytically plating a previously electroless plated polymer substrate containing units derived from at least one member of the group consisting of acrylonitrile, butadiene and styrene, in an environment free of chromium ions and carboxylic acids, the improvement comprising the intial step of:

a) roughening and activating the surface of the polymer by contacting the same with a solution, expressed in terms of total solution comprising:

(i) about 15 to about 85% w/w of concentrated sulfuric acid of about 97% acid strength, about 0 to about 55% w/w of concentrated nitric acid of about 71% acid strength and about 0 to about 80% w/w of concentrated phosphoric acid of about 85% acid strength,

(ii) about 0.001 to about 5% w/w of a noble metal ion, excluding palladium,

(iii) about 0.1 to about 30% by weight of an oxidant selected from the group consisting of nitric acid, hydrogen peroxide and persulfates provided that where nitric acid is present in (a) (i) in an amount of at least 10% w/w no additional amount of oxidant is required and

(iv) solvent capable of dissolving the above components, to a balance of 100% of total solution, provided that where the concentrated acid of (a) (i) is a sulfuric acid alone, its concentration shall be at least 45% w/w and the presence of nitric or phosphoric as an (a) (i) acid requires the presence of concentrated sulfuric acid, followed by the subsequent steps comprising

b) washing with the solvent following step (a) to substantially remove noble metal ions from the polymer substrate; and

c) immersing the substrate in an aqueous suspension of Pd^0 containing at least 0.001 to 5.0% w/w thereof.

5,160,601
HYDROCARBON CONVERSION WITH OCTANE-ENHANCING CATALYSTS

Theresa A. Pecoraro, San Ramon, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 511,822, Apr. 16, 1990, Pat. No. 5,001,097, which is a continuation of Ser. No. 252,236, Sep. 30, 1988, abandoned. This application Sep. 4, 1990, Ser. No. 577,399

Int. Cl.[5] C10G *11/02*

U.S. Cl. 208—120 **4 Claims**

1. A process for catalytically cracking hydrocarbonaceous feedstock, wherein said cracking catalyst consists essentially of a composition for increasing the octane and yield of gasoline produced from a fluid catalytic cracking process, said composition consisting essentially of:

a. large pore zeolite;

b. natural or synthetic clay; and

c. an amorphous silica-alumina matrix, wherein said matrix is prepared by mixing a silica sol and an aluminum salt while maintaining the pH of said mixture below about 4, and precipitating a cogel from said mixture by adjusting the pH; and wherein said composition is prepared by steps consisting essentially of:

(i) combining said zeolite, clay, and cogel, provided that the pH of said cogel or said combination containing said cogel is adjusted to between about 4 and 7, and conditions are controlled to induce syneresis and viscosity reduction to provide a cogel having meso and macro pore sizes and a N_2 pore size distribution peak diameter ranging from about 30 Å to 260 Å, and further provided that when said zeolite is introduced into said combination the pH is between about 3 and 7; and

(ii) forming said combination into particles.

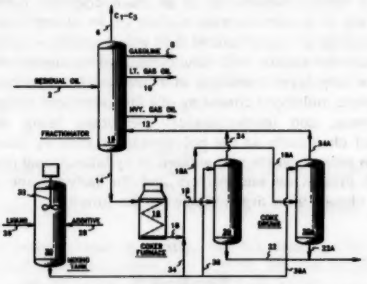
5,160,602
PROCESS FOR PRODUCING ISOTROPIC COKE

Lloyd G. Becraft, and Edward J. Nanni, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Sep. 27, 1991, Ser. No. 766,998

Int. Cl.[5] C10G *9/14*

U.S. Cl. 208—131 **15 Claims**



1. A process which comprises combining a non-air-blown low sulfur heavy aromatic mineral oil which does not produce acceptable isotropic coke when subjected to delayed coking, with an inorganic additive which promotes pyrolysis and which vaporizes during calcining of the coke and thereafter subjecting the combination to delayed cooling to produce acceptable isotropic coke which is subsequently subjected to calcining, wherein the inorganic additive is selected from the group consisting of elements from groups IVA and VA of the

Periodic Table and sulfides of such elements, which vaporize during calcining of the coke.

5,160,603

CATALYTIC CRACKING WITH SULFUR COMPOUND ADDED TO THE FEED

Lillian A. Rankel, Princeton, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Mar. 13, 1991, Ser. No. 668,571
Int. Cl.[5] C10G *55/00, 57/00*
U.S. Cl. 208—252 **19 Claims**

1. A process for decomposing metallo-porphyrins and porphyrins dissolved or suspended in a heavy feed and subsequently cracking said heavy feed which comprises

dissolving in the heavy feed hydrogen sulfide and thermally treating the feed for a time and at a temperature sufficient to at least partially decompose metalloporphyrins, while maintaining the feed at a pressure below 200 psig and sufficient to maintain a majority, by weight, of said feed in the liquid phase, to produce a treated feed comprising decomposed metalloporphyrins;

contacting and fluidized catalytically cracking said thermally treated feed by contact with:

a contact material having an affinity for metals in decomposed metalloporphyrins, and depositing metals on the contact material to produce a demetallized heavy liquid feed; and

a zeolite containing cracking catalyst; and

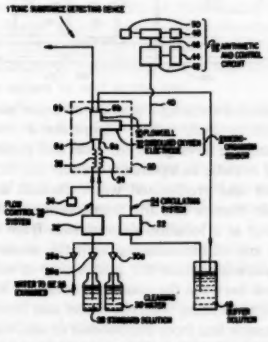
catalytically cracking said heavy liquid feed in the absence of added hydrogen with said zeolite containing cracking catalyst at fluidized catalytic cracking conditions including an initial mixing temperature of catalyst and said heavy liquid feed of about 1,000 F. up to about 1150 F. to produce a catalytically cracked product.

5,160,604

TOXIC SUBSTANCE-DETECTING SYSTEM WITH FIXED MICROORGANISM MEMBRANE FOR WATER QUALITY-MONITORING

Eiichi Nakamura; Hiroaki Tanaka, both of Ibaraki; Yoshiharu Tanaka, Kanagawa; Takashi Iitake, Kanagawa, and Hiroshi Hoshikawa, Kanagawa, all of Japan, assignors to Fuji Electric Co., Ltd., Kanagawa and Public Works Research Institute, Ibaraki, both of, Japan

Filed Feb. 5, 1991, Ser. No. 649,863
Claims priority, application Japan, Feb. 5, 1990, 2-25654; Dec. 26, 1990, 2-406437
Int. Cl.[5] C12M *1/34*
U.S. Cl. 210—85 **22 Claims**



1. A toxic substance-detecting device comprising:

a microorganism sensor comprising a flow cell including a fixed-microorganism membrane having a first side and a second side, said sides being separated by the membrane thickness and a dissolved oxygen electrode, said dissolved oxygen electrode being in contact with said first side of said fixed-microorganism membrane;

circulating means connected to said microorganism sensor through a first heat exchanger for circulating a buffer solution from a source of buffer solution and sending said buffer solution to said first side of said fixed-microorganism membrane;

flow control means connected to said microorganism sensor through a second heat exchanger for selectively supplying, at any one time, one of the following solutions to said second side of said fixed-microorganism membrane from respective sources: (1) water to be examined, (2) a standard solution, and (3) cleaning water; and

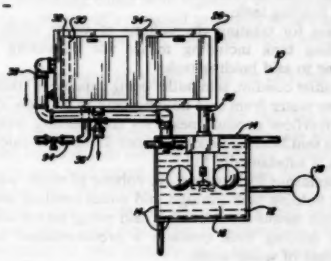
an arithmetic and control circuit arranged for receiving output signals from said microorganism sensor through a conducting means and processing said output signals to control operation of components of said toxic substance-detecting device.

5,160,605

DEVICE FOR SEPARATING HYDROCARBON PRODUCTS FROM WATER WITH VENTURI JET PUMP

Andrew Noestheden, Tecumseh, Canada, assignor to Valiant Machine & Tool Inc., Windsor, Canada

Filed Apr. 10, 1991, Ser. No. 682,935
Int. Cl.[5] B01D *17/12, 17/025*
U.S. Cl. 210—97 **15 Claims**



1. A device for separating hydrocarbon products from a mixture of hydrocarbon products and water comprising:

a receiving tank defining a reservoir means for receiving a mixture of water and hydrocarbon products, said hydrocarbon products forming an upper layer of said mixture in said receiving tank, said mixture having a top surface establishing a liquid level when said mixture is in said receiving tank,

a settling tank,

means for skimming said upper layer of said mixture in said receiving tank into a pumping chamber,

means for pumping the skimmed upper layer of said mixture in said pumping chamber to said settling tank, said pumping means comprising a venturi pump means, said means for skimming comprising,

a weir operatively disposed between said receiving tank and said pumping chamber, said weir having a channel section extending below the liquid level which allows fluid flow from said receiving tank to said pumping chamber, and

means for maintaining said channel section at a predetermined distance below the liquid level in said receiving tank so that said channel section is positioned at substantially a same predetermined distance beneath the liquid level in said receiving tank regardless of the amount of said mixture in said receiving tank.

5,160,606

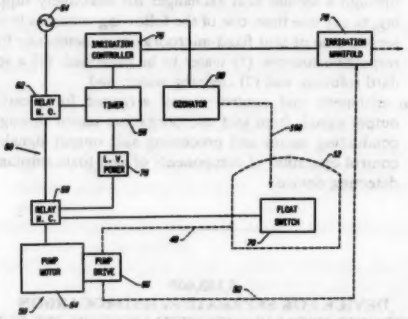
GRAY WATER RECOVERY SYSTEM WITH OZONE TREATMENT

Mitch D. De Simone, 4374 Hillview Dr., and Bruce G. Heieren, 4380 Hillview Dr., both of Pittsburg, Calif. 94565

Filed Apr. 5, 1991, Ser. No. 681,130

Int. Cl.[5] A61L *2/26*; B01D *17/12*

U.S. Cl. 210—110 **9 Claims**



1. A waste water recovery system for transporting given volumes of waste water to a reuse entity, comprising:

a. a holding tank having an upper portion and an opposite lower portion;

b. a waste water conduit leading into said holding tank, said waste water conduit carrying a volume of waste water to said holding tank;

c. means for treating the volume of waste water in said holding tank including means for delivering gaseous ozone to said holding tank;

d. an outlet conduit, said outlet being capable of transporting waste water from said holding tank to an reuse entity;

e. an overflow conduit means for transporting waste water from said holding tank to a waste drain when said holding tank is substantially full;

f. pump means for drawing the volume of waste water from said holding tank through said outlet conduit; and

g. switch means for activating said pump means only when said holding tank contains a predetermined minimum amount of waste water.

5,160,607

FILTER FOR AQUARIUM

Helmut Thiemer, Allersberg; Walter Schöttner, Deizisau, and Peter Voss, Kirchheim/Teck, all of Fed. Rep. of Germany, assignors to Eheim GmbH & Co. KG, Deizisau, Fed. Rep. of Germany

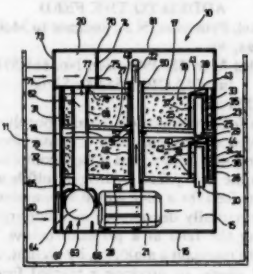
Filed Apr. 24, 1991, Ser. No. 690,716

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1990, 4013324

Int. Cl.[5] A01K *63/04*

U.S. Cl. 210—128 **65 Claims**

1. A filter for aquarium, comprising a housing having a bottom chamber and at least one filter compartment for a filter material, said at least one filter compartment being located above said bottom chamber; means forming a supply opening supplying water from said aquarium to said filter compartment so that said water passes and filter compartment and flows to said bottom chamber; means for pumping water from said bottom chamber back into said aquarium, said at least one filter compartment having at least one overflow aspiration lifting device, said overflow aspiration lifting device having a substantially vertical outlet pipe extending from said bottom chamber and having a lower end which forms an outlet opening, said overflow aspirating lifting device also having an upwardly closed outer pipe which is arranged over said outlet pipe to form a radial ring space, said outer pipe having a closed upper side which extends above an open upper end of said outlet pipe at a distance therefrom to form an axial overflow chamber, said outer pipe having an inlet located at a base side



and substantially at a height of a bottom of said filter compartment; and at least one bypass conduit which connects said bottom chamber with said supply opening, said bypass conduit having an end leading to said bottom chamber and provided with a float-controlled value device.

5,160,608

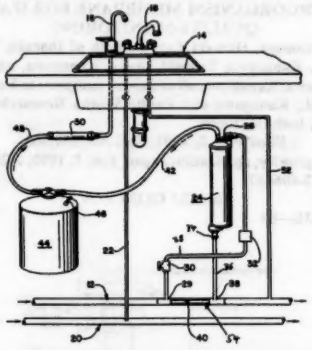
HIGH EFFICIENCY WATER TREATMENT SYSTEM

William W. Norton, Lincolnshire, Ill., assignor to Culligan International Company, Northbrook, Ill.

Continuation-in-part of Ser. No. 597,207, Oct. 11, 1990, abandoned. This application Sep. 23, 1991, Ser. No. 763,931

Int. Cl.[5] B01D *21/30, 63/00*

U.S. Cl. 210—134 **15 Claims**



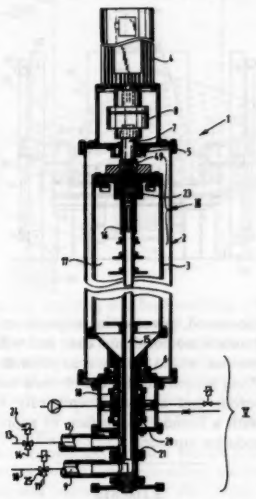
1. A system for treating a portion of water passing through a pressurized conduit, which comprises: a reverse osmosis membrane module having a water inlet and product water and waste water outlets; an upstream branch line for communication between said pressurized water conduit and said water inlet; another branch line for connection to said pressurized water conduit at a location downstream from said upstream branch line and communicating with the waste water outlet; and flow restrictor means for positioning in said pressurized water conduit between the conduit connection locations of the respective branch lines, whereby water can flow through said upstream branch line from the conduit to said water treatment means, and water can flow from the treatment means through the other downstream branch line back to the conduit when water is flowing through said conduit, said reverse osmosis module having a Void Volume Ratio of at least about 0.5.

5,160,609

CENTRIFUGAL SEPARATOR WITH DISCHARGE OF SEPARATED CONSTITUENTS BY BRAKING MOMENT

Jan W. Van Der Herberg, De Wieksiag 28, Heereaveen, Netherlands 8446 KT

Filed Aug. 30, 1990, Ser. No. 575,423
Int. Cl.[5] B01D *17/038, 17/12;* B04B *9/02, 11/02*
U.S. Cl. 210—143 14 Claims



1. A separator for separating relatively heavy constituents from a liquid composition containing said constituents and recovering a relatively clean liquid therefrom, said separator comprising:

a frame and a closed drum supported on said frame for rotation about a center line;

means for feeding a liquid composition into said drum;

drive means, operatively associated with said drum, for rotating a drum so as to separate liquid composition into said clean liquid and said constituents by depositing said constituents on an inner wall of said drum be centrifugal force and thus displacing said clean liquid in an annular layer situated radially inward of said constituents;

first discharge means, selectively connectable to said drum, for discharging said clean liquid from said drum;

second discharge means, selectively connectable to said drum, for discharging said constituents from said drum;

means for selectively connecting one of said first or second discharge means to said drum; and

means for halting flow of liquid through said means for feeding and said first discharge means to result in capturing of a remaining liquid in said drum; and

means for churning said remaining liquid so as to aid in removal of said constituents from said inner wall, said means for churning comprising braking means for exerting a braking moment on said drum.

2. A separator as claimed in claim 1, wherein:

said drive means comprises a motor reversible in drive rotation direction; and

said braking means comprises means for reversing a direction of rotation of said motor.

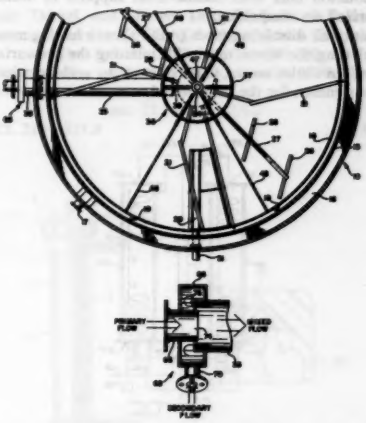
3. A separator as claimed in claim 2, wherein the motor is an electrical DC-motor, and further comprising means, operatively associated with said device, for controlling operation of said motor.

5,160,610

RADIAL HEADER FOR DISSOLVED AIR FLOTATION SYSTEMS

David W. O'Reilly, Olathe, Kans., assignor to Smith & Loveless, Inc., Lenexa, Kans.

Filed Nov. 13, 1990, Ser. No. 612,182
Int. Cl.[5] C02F *1/24;* B01D *17/035*
U.S. Cl. 210—194 3 Claims



1. In combination with a dissolved air flotation apparatus means for separating solids from liquids, a distribution header for feeding a mixture of a recycled gas-liquid stream and a raw solids-containing liquid stream, said distribution header comprising:

a cylindrical primary inlet pipe means for carrying the raw solids-containing stream;

a cylindrical mixed flow pipe means for carrying a mixture of the recycled gas-liquid stream and the raw solids-containing liquid stream into the dissolved air flotation apparatus means, said mixed flow pipe means being of larger diameter than the primary inlet pipe means;

a chamber means secured to said primary inlet pipe means and said mixed flow pipe means in substantially concentric relationship to said primary inlet pipe means and said mixed flow pipe means, said chamber being of larger diameter than said mixed flow pipe means; and

tangential port means for introducing the recycled gas-liquid stream tangentially into said chamber means whereby the gas-liquid stream introduced into said mixing chamber means achieves rotary and turbulent motion so that the gas-liquid stream and the raw solids-containing liquid stream are mixed in said mixed flow pipe means.

5,160,611

WATER APPARATUS FOR AERATING

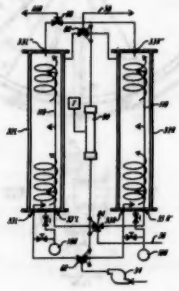
Milos Krofta, Lenox, Mass., assignor to Lenox Institute for Research, Inc., Lenox, Mass.

Continuation of Ser. No. 525,890, May 17, 1990, Pat. No. 5,078,861, which is a continuation of Ser. No. 241,384, Sep. 7, 1988, Pat. No. 4,931,175. This application Sep. 6, 1991, Ser. No. 756,323
The portion of the term of this patent subsequent to Jun. 5, 2007, has been disclaimed.
Int. Cl.[5] C02F *1/24*
U.S. Cl. 210—205 6 Claims

2. In apparatus for clarifying raw water containing particulate contaminates where the apparatus includes (i) a cylindrical flotation tank, (ii) an inlet means to the flotation tank for raw water, (iii) flotation tank inlet means for aerated water that also feeds the flotation tank, (iv) means for controlling the water

level within the tank, (v) means for removing floated sludge from the surface of the water held in the tank which is formed by a flow of rising air bubbles released from the aerated water in the tank which coalesce with particulate contaminants from the raw water and with a flocculation agent introduced into the flotation tank, and (vi) clarified water outlet means for directing the clarified water with contaminants thus removed from the flotation tank, wherein the improvement comprises means for producing a supply of pressurized, aerated water to said flotation tank inlet means from supplies of water and pressurized air comprising,

a pair of air dissolving tubes (ADT's) each having means for inletting the water, means for inletting the pressurized air and an outlet means that connects to said flotation tank inlet means for the pressurized, aerated water,



a first three way valve that directs inlet water to one ADT inlet means while closing the other inlet means,

a second three way valve that directs pressurized air to one ADT inlet means while closing the other ADT inlet means,

a third three way valve that directs the outlet means of one ADT to said aerated water inlet means while closing the other ADT outlet means, and

means for operating said valves in coordination with one another so that during one half cycle of operation said water inlet means and outlet means from one tube is closed while said air inlet means of the same tube is open and said water inlet means and outlet means to the other ADT are open while its air inlet means is closed, the positions of said valve means being reversed during a second half cycle of operation.

5,160,612

LIFTING SUPPORT FRAME FOR A FILTER PRESS

Ante Skocic, Limburg/Lahn, and Jurgen Fresenius, Bad Schwalbach, both of Fed. Rep. of Germany, assignors to Passavant-Werke AG, Fed. Rep. of Germany

Filed Jan. 23, 1991, Ser. No. 644,600

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1990, 4002510

Int. Cl.[5] B01D *25/12*

U.S. Cl. 210—230 **12 Claims**

1. An apparatus for extracting water from a product or sewage sludge on the spot, comprising:

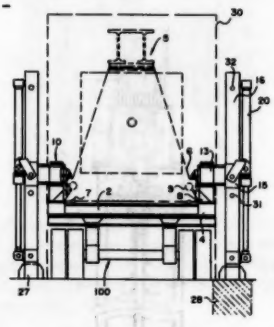
a plate filter press,

an essentially rectangular frame receiving the plate filter press, the four corners of said rectangular frame defining a plane,

the frame being adapted to fit onto the platform of a low loader transport vehicle and having a contour coinciding with said plane which includes a width substantially no greater than the width of the low loader transport vehicle,

said frame having a plurality of lifting support means for lifting the frame and filter press in a raised position above the platform of the low loader transport vehicle, each said lifting support means being extendable between raised and lowered positions along a respective axis oriented perpendicularly to said plane,

means for pivotally mounting each lifting support means to the major sides of said rectangular frame for movement between a raised pivoted in inoperative position and a lowered pivoted out operative position, each said means for pivotally mounting being pivotable about a respective axis oriented perpendicularly to said plane,



wherein, in the raised, pivoted in inoperative position, the lifting support means are positioned over and within the width of the frame contour, and in the lowered pivoted out operative position the lifting support means are pivoted outwardly from the frame contour and extend downwardly therefrom for engagement with a foundation surface to support the frame above the foundation surface.

5,160,613

PURIFICATION UNDERDRAIN WITH COMPENSATING CHAMBER AND BAFFLE ISOLATING BACKWASH GAS FROM BACKWASH WATER

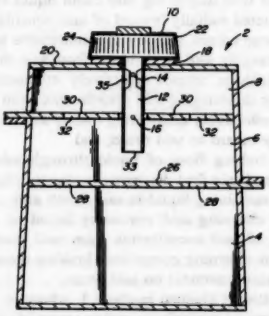
Thomas P. Walter, Dallas, Pa., assignor to Unifilt Corporation, Wilkes-Barre, Pa.

Continuation of Ser. No. 518,687, May 3, 1990, Pat. No. 5,068,034. This application Jul. 30, 1991, Ser. No. 738,089

The portion of the term of this patent subsequent to Nov. 26, 2008, has been disclaimed.

Int. Cl.[5] B01D *24/26*

U.S. Cl. 210—274 **9 Claims**



1. An underdrain lateral for use in a liquid purification system, said lateral comprising: means comprising a gas chamber for isolating gas used in filter backwashing from water used in filter backwashing, a compensating chamber containing said water positioned below said gas chamber, a primary chamber positioned below said compensating chamber and a horizontal baffle between said gas and said compensating chambers hav-

ing at least one opening therein to allow gas to flow from said gas chamber into said compensating chamber.

5,160,614

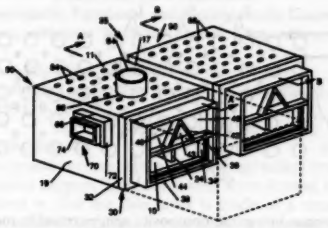
AIR DUCT BLOCK FOR AIR/WATER UNDERDRAIN SYSTEMS IN GRAVITY FILTERS

Marvin A. Brown, Sewickley, Pa., assignor to The F.B. Leopold Company, Inc., Zelienople, Pa.

Filed Feb. 25, 1992, Ser. No. 841,046

Int. Cl.[5] B01D *24/24, 24/46*

U.S. Cl. 210—275 **15 Claims**



8. A system for draining and backwashing a filtering media of a type where liquid may be passed downward through the media in a filtration mode to an underdrain supporting said media, said underdrain including a plurality of underdrain filter blocks placed end to end in parallel adjacent rows, each row defining a lateral, said system adapted to supply a backwash gas to the underdrain during a backwash mode for cleansing the media, said system comprising:

a row of interconnected air duct blocks positioned below said filtering media and extending substantially transversely to said laterals, each air duct block having a bottom surface, a top surface, a pair of sidewalls extending between said top and bottom surfaces and a plurality of interior walls defining at least one lower water chamber, at least one upper gas chamber, and at least one mixing chamber with a middle partition extending between said sidewalls and parallel to said top and bottom surfaces, said interior walls having apertures therein for communication between the lower water chamber and the mixing chamber and further between the upper gas chamber and the mixing chamber;

each air duct block in communication with at least one adjacent underdrain filter block to supply backwash gas to said underdrain filter block during the backwash mode;

each air duct block having a transverse trough defined by an opening in said top surface and a cutaway portion in each sidewall, said trough further defined by a saddle assembly which is integral with said middle partition and with the interior walls which define said upper gas chamber, said saddle assembly having at least one aperture for providing communication between the upper gas chamber and said trough;

an integral tube which is received by the troughs in each of said interconnected air duct blocks and which extends transversely to said laterals, said tube having apertures therein corresponding to the apertures in said saddle assemblies to provide communication between said tube and said upper gas chambers;

a cover having a plurality of dispersion orifices therein extending above the trough in each air duct block and defining a mixing chamber above said tube, said mixing chamber in communication with the mixing chambers in said air duct block;

means for supplying backwash gas to said tube;

wherein backwash gas is supplied to said tube and backwash water is supplied to said lower water chambers during the backwash mode, said backwash gas entering the upper gas chambers in each air duct block through the apertures in said tube thus supplying backwash gas to the underdrain filter blocks of at least one adjacent underdrain lateral, backwash gas and backwash water further entering said mixing chambers through said interior wall apertures and then passing through said dispersion orifices to cleanse media directly above the air duct block.

5,160,615

HOLLOW FIBER TYPE LIQUID PROCESSING APPARATUS

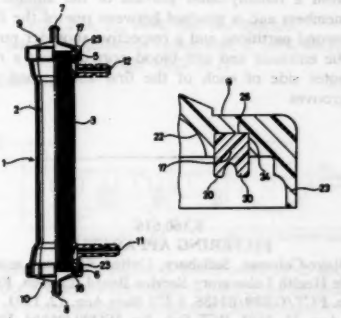
Toshiaki Takagi, and Hiromi Deguchi, both of Fujinomiya, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 18, 1991, Ser. No. 687,718

Claims priority, application Japan, Apr. 18, 1990, 2-102464; Apr. 19, 1990, 2-103944

Int. Cl.[5] B01D *63/02*

U.S. Cl. 210—321.8 **16 Claims**



1. A hollow fiber tube blood processing apparatus, comprising:

a housing having a first and a second end portion;

a bundle of hollow fibers that includes a plurality of hollow fibers for processing blood, the bundle of hollow fibers being housed in the housing, the bundle of hollow fibers having a first and a second end portion;

an inlet and an outlet respectively positioned adjacent the first and the second end portions of the housing for enabling a blood processing liquid to move into and out of the housing;

first and second partitions for respectively securing the first and second end portions of the bundle of hollow fibers to the first and second end portions of the housing;

an entrance blood port having a blood inlet attached to the first end portion of the housing; and

an exit blood port having a blood outlet attached to the second end portion of the housing;

the entrance blood port having:

a first annular groove provided at a peripheral area of an inside surface thereof;

a first annular elastic member conjoined in the first annular groove by molding; and

a first annular elastic rib extending out of the first annular groove;

the exit blood port having:

a second annular groove provided at a peripheral area on an inside surface thereof;

a second annular elastic member conjoined in the second annular groove by molding; and

a second annular elastic rib extending out of the second annular groove;

the entrance blood port being attached to the housing by pressing the first annular elastic member toward the first partition so that the first annular elastic rib is pinched between the first partition and an annular rib of the entrance blood port that defines a radially-inner side of the first annular groove of the entrance blood port;

the exit blood port being attached to the housing by pressing the second annular elastic member toward the second partition so that the second elastic annular rib of the second elastic annular member is pinched between the second partition and an annular rib of the exit blood port that defines a radially-inner side of the second annular groove of the exit blood port;

said first and second annular elastic ribs respectively comprising:

at least a first annular elastic rib portion that extends from a radially-inner portion of each of the annular elastic members and is pinched between one of the first and second partitions and a respective one of the annular ribs of the entrance and exit blood port defining the respective radially-inner side of the first and second annular grooves; and

at least a second annular elastic rib portion which extends from a radially-outer portion of the annular elastic members and is pinched between one of the first and second partitions and a respective shoulder portion of the entrance and exit blood port defining a radially-outer side of each of the first and second annular grooves.

5,160,616

FILTERING APPARATUS

B. C. Blake-Coleman, Salisbury, United Kingdom, assignor to Public Health Laboratory Service Board, London, England

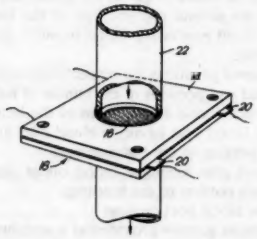
PCT No. PCT/GB89/01485, § 371 Date Aug. 12, 1991, § 102(e) Date Aug. 12, 1991, PCT Pub. No. WO90/06804, PCT Pub. Date Jun. 28, 1990

PCT Filed Dec. 12, 1989, Ser. No. 721,471

Claims priority, application United Kingdom, Dec. 12, 1988, 8828949

Int. Cl.[5] B01D *63/08, 65/02, 69/06, 69/10*

U.S. Cl. 210—321.84 **8 Claims**



1. Filtering apparatus for the selective filtration of microparticles comprising first and second filter elements each having a planar working surface and a plurality of filter apertures opening to said working surface in a regular array, the filter elements being arranged with the respective working surfaces substantially in contact, such that relative displacement of the elements in a direction in the plane of the working displacement of the elements in a direction in the plane of the working surfaces serves to bring the apertures of the first filter element into greater or lesser register with the apertures of the second filter element, the relative position of the filter elements corresponding with the maximum registry providing an effective pore size of the apparatus of up to about 50 microns; and control means for displacing at least one of said filter elements relative to the other filter element in said direction thereby bringing the apertures of the first filter element into greater or lesser register with the apertures of the second filter element.

5,160,617

POROUS INORGANIC COMPOSITE SEMIPERMEABLE MEMBRANE AND A METHOD OF PREPARATION

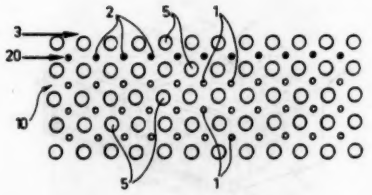
Marcel B. J. Huis In't Veld; Robert J. R. Uhlhorn; Yve-Sheng Lin; Klaas Keizer, and Anthonie J. Burggraaf, all of Ae Enschede, Netherlands, assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Apr. 10, 1991, Ser. No. 683,079

Claims priority, application France, Apr. 12, 1990, 90 04755

Int. Cl.[5] B01D *71/02*

U.S. Cl. 210—490 **6 Claims**



1. A porous inorganic composite semipermeable membrane provided with a support and a separating layer which has pores with an average diameter less than 1 μm and which comprises at least two refractory metal oxides, wherein:

said separating layer is composed of grains of a first oxide phase and grains of at least one second oxide which is dispersed over and chemically bonded to the first oxide phase, so as to constitute at least a portion of the free surface of the grains of said first oxide phase and at least a portion of the grain boundaries between the grains of said first oxide phase;

said first oxide phase and said second oxide are chosen so that the second oxide slows down diffusion both at the surface and at the grain boundary of the first oxide phase and has low solubility in said first oxide phase; and

the volume of said second oxide lies in the range of 0.1% to 25% of the volume of said first oxide phase.

5,160,618

METHOD FOR MANUFACTURING ULTRATHIN INORGANIC MEMBRANES

Antonij J. Burggraaf, Enschede, Netherlands, and Yue-Sheng Lin, Cincinnati, Ohio, assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 2, 1992, Ser. No. 816,206

Int. Cl.[5] B01D *53/22*

U.S. Cl. 210—490 **24 Claims**

9. A method for manufacturing an ultrathin inorganic membrane comprising a yttria-stabilized zirconia layer having a thickness less than or equal to about 0.5 μm which is deposited onto a porous metal-doped alumina surface layer of a porous alumina substrate, the method comprising:

(a) independently heating halides of yttrium and zirconium to temperatures sufficient to vaporize each of the metal halides;

(b) introducing the vaporized metal halides into a first chamber of a reactor comprising two chambers which are connected by a removable porous alumina substrate having a network of pores capable of transporting gases between the chambers, said removable porous alumina substrate further comprising a porous metal-doped alumina surface layer having an average pore diameter of less than or equal to about 50 nm;

(c) introducing an oxidizing agent into a second chamber of the reactor;

(d) contacting the metal halides and the oxidizing agent in the pores of the metal-doped alumina layer at a temperature, a pressure and for a time sufficient to deposit plugs of the yttria stabilized zirconia within the pores of the metal-

doped alumina surface layer and to restrict growth of the plugs to a thickness of less than or equal to 0.5 μm to form the inorganic membrane.

23. An inorganic membrane formed by the process according to claim 9 which comprises a yttria-stabilized zirconia layer having a thickness less than or equal to about 0.5 μm which has been deposited onto a metal-doped porous alumina surface layer of an alumina substrate having an average pore diameter of less about 50 nm.

5,160,619

COMPOSITE REVERSE OSMOSIS MEMBRANE AND PRODUCTION THEREOF

Tomoo Yamaguchi, Toyohashi, and Kenichi Ikeda, Kusatsu, both of Japan, assignors to Nitto Denko Corporation, Osaka, Japan

Filed Sep. 13, 1991, Ser. No. 759,021
Claims priority, application Japan, Sep. 14, 1990, 2-245144; Aug. 28, 1991, 3-244647
Int. Cl.[5] B01D *69/12, 71/56*
U.S. Cl. 210—500.38 **6 Claims**

1. A composite reverse osmosis membrane which comprises a microporous support layer and a thin layer formed thereon, characterized in that the thin layer is made of a crosslinked polyamide which comprises a polyamine component having two or more amino groups in the molecule and an acid component containing linear aliphatic polyacid halide having three or more halogenated carbonyl groups in the molecule.

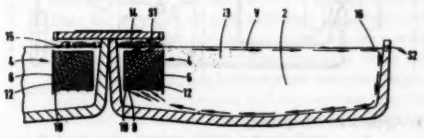
3. A process for producing a composite reverse osmosis membrane composed of a microporous support layer and a thin layer supported thereon, said process comprising forming on the support layer a first layer of an aqueous solution containing a polyamine and an amine salt, forming on the first layer and a second layer of a solution in a water-immiscible organic solvent of an acid component containing a linear aliphatic polyacid halide having three or more halogenated carbonyl groups, and heating the two layers for drying, thereby forming a thin layer of crosslinked polyamide on the microporous support layer.

5,160,620

METHOD AND APPARATUS FOR TREATING WATER

Eivind Lygren, Oslo, Norway, assignor to Sunfish, Ltd. A.S., Lysaker, Norway

PCT No. PCT/NO89/00126, § 371 Date Jun. 7, 1991, § 102(e) Date Jun. 7, 1991, PCT Pub. No. WO90/06288, PCT Pub. Date Jun. 14, 1990
PCT Filed Dec. 7, 1989, Ser. No. 689,869
Claims priority, application Norway, Dec. 8, 1988, 88.5455
Int. Cl.[5] C02F *1/24, 3/06*
U.S. Cl. 210—608 **14 Claims**



1. A method of treating water, comprising:

providing a basin for containing and circulating water;

providing a chamber for aerating the water, said basin having a substantially larger volume than said chamber, and a diffusor at the bottom of said chamber;

circulating the water to said chamber from said basin, aerating the water, and returning the water to said basin by aerating the water with said diffusor, said diffusor producing, at atmospheric pressure, bubbles of a plurality of sizes throughout the range of 0.03 mm to 1 mm, including a substantial amount of larger size bubbles forming a foam at the surface of the water and a substantial amount of smaller size bubbles being entrained in the water flow through the chamber, returning to the basin and forming a flotation slurry;

forming a foam containing dissolved impurities of the water at the surface of the water in the chamber with said larger size bubbles;

removing said foam from the surface of the chamber;

forming a flotation slurry containing particulate impurities at the surface of the water in said basin with said smaller size bubbles; and

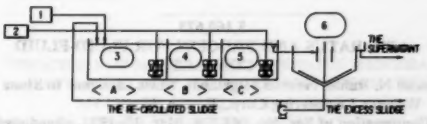
removing said slurry from the surface of said basin.

5,160,621

METHOD FOR TREATMENT OF WASTE WATER BY ACTIVATED SLUDGE PROCESS

Yoshimi Nagasaki; Takao Hashimoto, both of Kawasaki, Japan; Isao Takemura, Timur, Indonesia; Hiroshi Imai, Kawasaki, Japan; Yasunobu Hirama, Kawasaki, Japan, and Tadayoshi Nakajima, Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Jan. 31, 1989, Ser. No. 304,035
Claims priority, application Japan, Feb. 1, 1988, 63-19554
Int. Cl.[5] C02F *3/12*
U.S. Cl. 210—614 **2 Claims**



1. In a method for treatment of waste water by an activated sludge process where waste water is fed into an aeration tank system so as to decompose organic substances contained in said waste water by microorganisms in said tank system and said microorganisms are separated from the drainage drained from an aeration tank while a part of the separate microorganisms is recalculated to the tank system, the improvement which comprises: carrying out said treatment in an aeration tank system which comprises a first tank, a second tank and a third tank, wherein said waste water containing sludge in an amount of 0.5 to 1 kg·BOD/kg·ss·day and microorganisms are fed into the first tank while the ratio of aeration in the first tank is from 0.5 to 0.8 in terms of volume/minute relative to the liquid amount in said first tank, the dissolved oxygen concentration ranging from 0.5 to 1 ppm in the liquid and the pH ranging from 6.0 to 6.5, the ratio of aeration int he second tank si from 0.1 to 0.4 in terms of volume/minute relative to the liquid amount in said second tank, the dissolved oxygen concentration ranging form 1 to 3 ppm in the liquid of the second tank and the pH ranging from 6.1 to 6.7, and the ratio of aeration in the third tank is from 0.1 to 0.3 in terms of volume/minute relative to the liquid amount in the third tank, the dissolved oxygen concentration ranging from 0.5 to 1 ppm in the liquid of the third tank and the pH ranging from 6.3 to 7.0.

5,160,622

METHOD FOR FILTERING AQUARIUM WATER

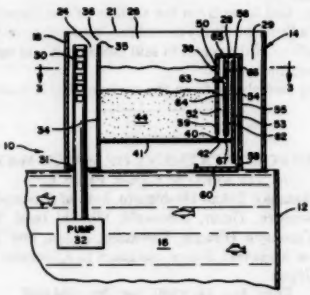
Dennis E. Gunderson, 5379 Temple Ct., Madison, Wis. 53705, and Eric G. Gunderson, 4033 Lori Cir., Madison, Wis. 53714

Continuation of Ser. No. 274,441, Nov. 17, 1988, abandoned. This application Oct. 9, 1990, Ser. No. 595,623
Int. Cl.[5] C02F *3/06*
U.S. Cl. 210—617 **7 Claims**

1. A method for continuously removing biological waste products from an aqueous medium in a filtering system located above an aquarium tank comprising a filter tank, a biological filtering medium adapted to culture bacterial useful in decomposing and detoxifying biological waste products into harmless substances and a siphon system, the method comprising the following steps in alternating sequence:

a. passing an aqueous medium to be filtered into the filter

tank, such that the aqueous medium fills the filter tank in such a manner to associate the aqueous medium with the filtering medium; and



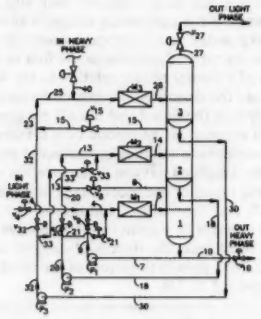
b. creating a wave-like action in the aquarium tank by draining the water rapidly from the filter tank, the draining water being initiated by the action of the siphon system.

5,160,623

APPARATUS AND PROCESS FOR FLUID-FLUID CONTACT

Jacob N. Rubin, Newton Highlands, Mass., assignor to Stone & Webster Engineering Corp., Boston, Mass.

Continuation of Ser. No. 663,398, Mar. 25, 1991, abandoned, which is a continuation of Ser. No. 259,791, Oct. 19, 1988, Pat. No. 5,076,930. This application Sep. 12, 1991, Ser. No. 759,706
The portion of the term of this patent subsequent to Dec. 31, 2008, has been disclaimed.
Int. Cl.[5] B01D *11/00*
U.S. Cl. 210—634 **9 Claims**



1. An apparatus for effecting liquid-liquid contact in a plurality of stages between two liquid streams having different specific gravities comprising:

(a) first in-line mixing means for receiving and mixing the liquid streams to form a dispersed liquid phase of globules of one stream dispersed in the other;

(b) a first separating vessel for receiving the dispersed liquid phase effluent from the first in-line mixing means wherein said effluent separates into a heavier medium in the bottom portion of the first separating vessel and into a lighter medium in the top portion of the first separating vessel;

(c) a first conduit means for receiving the bottom effluent from the first separating vessel and supplying said bottom effluent to the first in-line mixing means;

(d) a second in-line mixing means for receiving and mixing the liquid streams to form a dispersed liquid phase of globules of one stream dispersed in the other;

(e) a second conduit means for receiving the top effluent from the first separating vessel and supplying said top effluent to the second in-line mixing means;

(f) a second separating vessel for receiving the dispersed liquid phase effluent from the second in-line mixing means wherein said effluent separates into a heavier medium in the bottom portion of the second separating vessel and into a lighter medium in the top portion of the second separating vessel;

(g) a third conduit means for receiving the bottom effluent from the second separating vessel and supplying said bottom effluent to the first in-line mixing means;

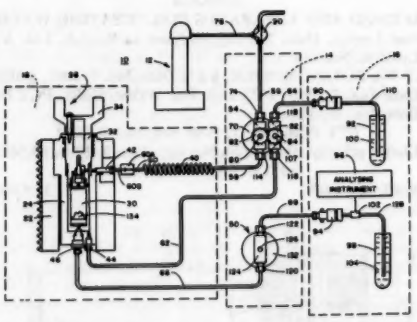
(h) a fourth conduit means for receiving the bottom effluent from the second separating vessel and supplying and bottom effluent to the first in-line mixing means; where the first in-line mixing means and second in-line mixing means are exteriorly and remotely located to the first separating vessel and second separating vessel.

5,160,624

APPARATUS AND METHOD FOR SUPERCRITICAL FLUID EXTRACTION

Dale L. Clay; Robert W. Allington; Daniel G. Jameson, and Robin R. Winter, all of Lincoln, Nebr., assignors to Isco, Inc., Lincoln, Nebr.

Continuation-in-part of Ser. No. 553,119, Jul. 13, 1990, Pat. No. 5,094,753. This application Nov. 22, 1991, Ser. No. 795,987
Int. Cl.[5] B01D *11/00*
U.S. Cl. 210—634 **21 Claims**



1. Apparatus comprising:

means for automatically performing supercritical fluid extraction on a series of samples one after the other without substantially handling the apparatus for supercritical fluid extraction between extractions;

said means for automatically performing supercritical fluid extractions including:

pressure vessel means having an interior, an exterior, an orifice for introduction of sample, a first port for fluid entrance and at least a second port for a fluid outlet; and

sample injector means for automatically injecting into the pressure vessel means a series of samples from a storage means for feeding samples in series and for extracting each sample prior to introducing the next sample.

5,160,625

METHOD FOR FLOW FIELD FLOW FRACTIONATION

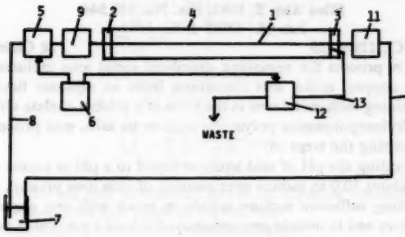
Jan Å. Jönsson, Malmö, and Alf Carlshaf, Lund, both of Sweden, assignors to Pharmacia LKB Biotechnology AB, Upsala, Sweden

Continuation of Ser. No. 457,682, filed as PCT/SE89/00318, Jun. 5, 1989, abandoned. This application Dec. 6, 1991, Ser. No. 803,449

Claims priority, application Sweden, Jun. 8, 1988, 8802126

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—635 8 Claims



1. A process for size separating sample constituents by the FFF technique in a porous hollow fiber extending longitudinally within and between the ends of a surrounding tube, the inlet end of said hollow fiber being connected to a first pump that pumps a liquid into the interior of the hollow fiber at a rate "a" that varies during the process, the outlet end of said hollow fiber being connected to a liquid reservoir, an interspace between said surrounding tube and said hollow fiber which is connected to a second pump having a suction flow rate "b" which is controlled to suck liquid radially outwardly through the wall of the porous hollow fiber to waste, comprising the sequential steps of

I. introducing a sample to be size separated into the porous hollow fiber via the liquid pumped into the fiber by the first pump,

II. maintaining the flow rate "a" of the liquid pumped into the inlet end of the fiber at a value less than the flow rate "b" of the liquid being sucked radially outwardly through the walls of the hollow fiber by the second pump which thereby causes liquid to flow from said reservoir back into the outlet end of the hollow fiber, thereby creating a flow rate gradient within the hollow fiber sufficient to permit concentration of the sample in the axial direction of the fiber for a period of time sufficient for equilibrating the constituents of the sample in a radial direction within the hollow fiber at different mean distances from the fiber wall according to particle size so that the larger sized constituents of the sample will concentrate near the fiber wall and the smaller sized constituents will concentrate toward the center of the hollow fiber,

III. smoothly increasing the flow rate "a" to a flow rate higher than the flow rate "b" to thereby cause a net flow of liquid out of the outlet end of the hollow fiber, and

IV. eluting the sample from the interior of the hollow fiber at a flow rate "a" that is maintained higher than flow rate "b", whereby the larger sized constituents of the sample that are concentrated near the wall of the hollow fiber, due to the lower axial flow near the fiber wall compared to the axial flow closer to the center of the hollow fiber, are retained in the hollow fiber for a longer period than the smaller sized particles of the sample that are not as close to the hollow fiber wall.

5,160,626

BLOTTING METHODS USING POLYALDEHYDE ACTIVATED MEMBRANES

Kariyawasam P. W. Pemawansa, Ann Arbor; Mark D. Heisler, Saline, both of Mich., and Menahem Kraus, Rehovot, Israel, assignors to Gelman Sciences Inc., Ann Arbor, Mich.

Division of Ser. No. 394,362, Aug. 15, 1989, Pat. No. 4,992,172, which is a continuation-in-part of Ser. No. 321,282, Mar. 9, 1989, Pat. No. 4,961,852, which is a division of Ser. No. 96,730, Sep. 14, 1987, Pat. No. 4,824,870. This application Sep. 7, 1990, Ser. No. 578,950

Int. Cl.[5] B01D *69/00*

U.S. Cl. 210—638 19 Claims

1. A method of transferring a biological sample to an immobilizing matrix, comprising applying the sample to an activated microporous membrane having 1) an internal surface comprising interstices or pore surfaces and 2) an external surface, which membrane comprises a membrane polymer that is non-covalently activated by having all said surfaces of the membrane physically coated with a polyaldehyde mixture in an amount sufficient to provide effective free aldehyde functionality on said surfaces for covalent bonding between the thus coated membrane and aldehyde reactive material of said sample and to thereby non-covalently activate the microporous membrane for said bonding without substantial damage to the pore structure.

5,160,627

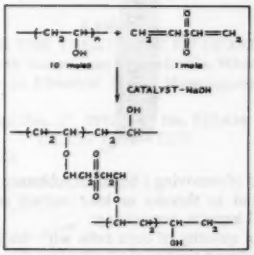
PROCESS FOR MAKING MICROPOROUS MEMBRANES HAVING GEL-FILLED PORES, AND SEPARATIONS METHODS USING SUCH MEMBRANES

Edward L. Cussler, Edina, Minn.; Gunilla E. Gillberg-LaForce, Summit; Michael J. Sansone, Berkeley Heights, both of N.J., and David K. Schisla, St. Louis, Mo., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 727,330, Jul. 3, 1991, abandoned, which is a continuation of Ser. No. 599,494, Oct. 17, 1990, abandoned. This application Dec. 27, 1991, Ser. No. 815,297

Int. Cl.[5] E01D *67/00*

U.S. Cl. 210—639 18 Claims



1. A method of modifying a hydrophobic microporous membrane, by providing a stabilized gelled liquid membrane immobilized in the pores of a microporous membrane having properties for enabling separations at high pressure drops across the membrane while substantially precluding loss of the liquid membrane by rejection from the microporous matrix, comprising the steps of:

(a) treating the membrane with a surfactant;

(b) draining excess surfactant from the membrane;

(c) drying the membrane;

(d) preparing an aqueous solution of at least one polyol and at least one compound selected from the group consisting of divinyl sulfone and divinyl sulfone precursors;

(e) treating the membrane with the aqueous solution;

(f) removing aqueous solution from the exterior of the membrane by washing the membrane with water;

(g) crosslinking the aqueous solution in the pores of the membrane; and

(h) washing the membrane with water, to yield a hydrophilic membrane having pores filled with a water-soluble gel sufficient to provide said properties.

5,160,628

METHOD OF MAKING A FILLER FROM AUTOMOTIVE PAINT SLUDGE, FILLER, AND SEALANT CONTAINING A FILLER

Michael J. Gerace, and Janet M. Gerace, both of Dayton, Ohio, assignors to Aster, Inc., Yellow Springs, Ohio

Filed Sep. 20, 1991, Ser. No. 763,324

Int. Cl.[5] B01D *37/00*

U.S. Cl. 210—667 **12 Claims**

8. A method for treating paint sludge containing water, solvent, and uncured polymer resin comprising:

removing a first portion of said water by mechanically drying said paint sludge to remove gross water and solvent without altering the composition of the paint sludge and to produce a concentrated sludge, and

removing a second portion of said water by agitating said concentrated sludge under a vacuum at a temperature not exceeding 100° F. so that said uncured polymer resin remains uncured to produce a dehydrated putty containing uncured polymer.

5,160,629

METHOD FOR REMOVING OIL SPILLS USING A NATURAL, RECYCLABLE ABSORBENT

Adria Brown, 2177 Colony Club Ct., West Bloomfield, Mich. 48322

Continuation-in-part of Ser. No. 511,645, Apr. 20, 1991, abandoned. This application Jun. 10, 1991, Ser. No. 712,503

Int. Cl.[5] C02F *1/28*

U.S. Cl. 210—671 **14 Claims**

1. A method of removing a liquid oil substance from an earth surface material to thereby at least reduce ecological and environmental impacts, comprising:

contacting a quantity of corn cobs with the liquid oil substance to absorb the liquid oil substance from said material onto the corn cobs, the corn cobs being the entire corn cobs, including the zone of the floral bract corn cob components integral with the inner rachis of the corn cob components.

5,160,630

SCALE INHIBITION

Brian G. Clubley, Wilmslow, and Jan Rideout, Bolton, both of England, assignors to FMC Corporation, Philadelphia, Pa.

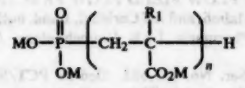
Filed Sep. 23, 1991, Ser. No. 764,040

Claims priority, application United Kingdom, Sep. 29, 1990, 9021261

Int. Cl.[5] C02F *5/10*

U.S. Cl. 210—699 **9 Claims**

1. A method of inhibiting the precipitation of calcium carbonate scale from an aqueous system, comprising adding to the aqueous system, a compound having the formula I:



I

in which M is hydrogen or an alkali metal ion, an ammonium ion or a quaternised amine radical; R_1 is hydrogen or methyl; and n is an integer ranging from 1 to 10.

5,160,631

METHOD FOR TREATING CHELANT SOLUTIONS TO REMOVE METALS IN SOLUTION

Jack G. Frost, and Kenneth J. Snyder, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Aug. 5, 1991, Ser. No. 740,544

Int. Cl.[5] C02F *1/62, 1/64*

U.S. Cl. 210—720 **18 Claims**

1. A process for removing dissolved metal ions including iron, copper, nickel and chromium from an aqueous liquid containing such metal ions in the form of a soluble chelate with an alkylenepolyamine polyacetic acid or its salts, said process comprising the steps of:

adjusting the pH of said aqueous liquid to a pH in excess of about 10.0 to induce precipitation of iron ions present;

adding sufficient sodium sulfide to react with any copper ions and to initiate precipitation of at least a portion of any copper ions present;

separating at least a portion of any precipitated iron and copper compounds from said aqueous liquid;

adding sufficient nitric acid to said aqueous liquid to adjust the pH to a level in the range of about 6 to 8;

adding sufficient sodium nitrite to said aqueous liquid to facilitate precipitation of nickel and chromium ions;

heating said aqueous liquid containing said nitric acid and sodium nitrite to a temperature above about 575° F. to effect at least partial breakdown of said polyacetic acid and thereby precipitate at least a portion of any chromium and nickel ions present; and

separating at least a portion of any precipitated chromium and nickel compounds from said aqueous liquid.

5,160,632

CYANIDE REMOVAL FROM COKE OVEN WASH WATERS

Jeffery L. Kleefisch, Valparaiso, Ind., and Vincent G. Spaeth, Downers Grove, Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Mar. 11, 1992, Ser. No. 849,570

Int. Cl.[5] C02F *1/58*

U.S. Cl. 210—724 **5 Claims**

1. A process for removing cyanide from an initial cyanide contaminated waste water containing from about 10 to about 1,000 parts per million cyanide which process comprises:

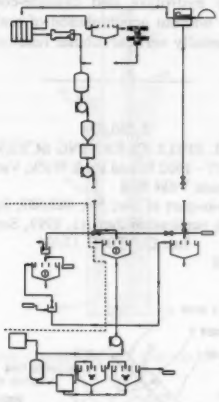
a) adjusting the pH of said cyanide contaminated waste water in a containment vessel, with mixing, to a pH of from about 3.0 to about 5.0; while;

b) adding thereto in the same containment vessel, an effective cyanide removing amount of a water soluble halogen-free ferric iron salt; and thereby forming a pH adjusted ferricyanide salt containing waste water; then

c) mixing said pH adjusted, ferricyanide salt containing waste water in the containment vessel thereby forming a ferric ferricyanide precipitate containing waste liquor, and then

d) charging the ferric ferricyanide precipitate containing waste liquor to a clarifier while adding thereto a high molecular weight water soluble polymeric flocculent, thereby forming a flocculated ferric ferricyanide containing sludge and a clarified liquor, said liquor containing no

more than 20% of the cyanide contained in the initial cyanide contaminated waste water,



e) removing said flocculated ferric ferricyanide containing sludge from said clarified liquor, and

f) discharging said treated clarified liquor.

5,160,633

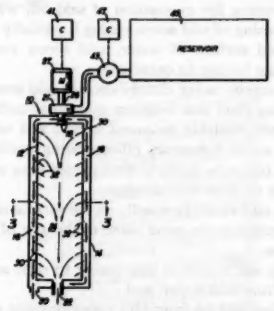
FRONTAL SEPARATOR SYSTEM FOR SEPARATING PARTICLES FROM BEVERAGE LIQUIDS

Ing-Tsann Hong, and Ernest C. Fitch, both of Stillwater, Okla., assignors to The Coca-Cola Company, Atlanta, Ga.

Continuation-in-part of Ser. No. 295,329, Jan. 10, 1989, abandoned. This application Jun. 5, 1990, Ser. No. 533,617

Int. Cl.[5] B01D *17/038*

U.S. Cl. 210—739 **26 Claims**



13. A method for removing particles from a beverage liquid in a frontal separator, the particles having a density greater than that of said beverage liquid and having a particle diameter size in the range of from about 0.5 to 500 micrometers comprising the steps of:

(a) feeding said beverage liquid into an annular separation chamber of said frontal separator between an inner, hollow, rotatable rotor that is perforated to provide openings therethrough enclosing a clarified beverage liquid outlet chamber and an outer rotatable casing mounted for rotation with said rotor, the diameter of the rotor perforations being substantially greater than that of said particles, and said rotor openings being at an angle to a radius of said rotor;

(b) rotating said rotor and casing;

(c) controlling the flow rate of said beverage liquid through said separator and the rotational speed of said rotor so as to prevent said particles from flowing through said rotor openings;

(d) feeding clarified beverage liquid out from said outlet chamber; and

(e) removing said separated particles from said separation chamber.

5,160,634

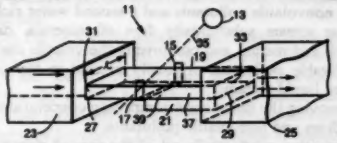
DESALINIZATION SYSTEM

David B. Chang, Tustin, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 659,766, Feb. 25, 1991, Pat. No. 5,094,758. This application Nov. 22, 1991, Ser. No. 800,899

Int. Cl.[5] C02F *1/30, 1/34, 1/58*

U.S. Cl. 210—748 **13 Claims**



1. System for precipitating a solute from a solution, the solute having an anion and a cation in combination with a solvent in the solution, the solvent having a predetermined dielectric value, the system comprising:

means for containing the solution; and

means for applying a predetermined amount of energy to the solution substantially at a resonance frequency of the solvent, for reducing the dielectric value of the solvent and vibrating the anion and cation, enabling them to combine and precipitate out of the solution.

5,160,635

Patent Not Issued For This Number

5,160,636

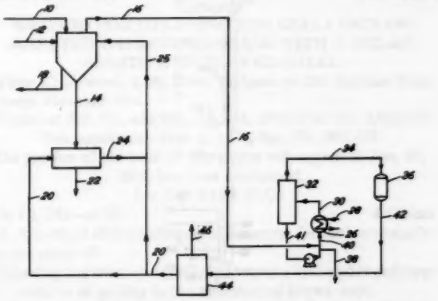
PROCESS FOR THE TREATMENT OF MIXED WASTES

Greg Gilles, North Aurora, and Matt Husain, Wheaton, both of Ill., assignors to Chemical Waste Management, Inc., Oak Brook, Ill.

Filed Jan. 17, 1992, Ser. No. 822,424

Int. Cl.[5] B01D *11/02*

U.S. Cl. 210—763 **16 Claims**



1. A process comprising: continuously treating mixed waste containing solids contaminated with radionuclides, volatile chemically oxidizable pollutants, and nonvolatile pollutants comprising toxic metals, in combination, the steps of:

(a) mixing the mixed waste and an extractant solution at conditions sufficient to effect the mass transfer of at least a porion of the radionuclides, volatile chemically oxidiz-

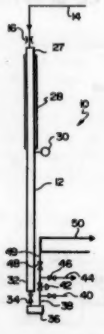
able pollutants, and nonvolatile pollutants from the solids present in the mixed waste to the extraction solution;
(b) removing the solids from the mixture of step (a) initially present in the mixed waste;
(c) mixing the solids from step (b) with a treated water stream;
(d) filtering and pressing the mixture from step (c) to form a filter cake and a dilute contaminant liquid stream;
(e) recycling the dilute contaminant liquid stream to the mixture of step (a);
(f) removing a contaminated liquid stream comprising the radionuclides, volatile chemically oxidizable pollutants, and nonvolatile pollutants from the mixture of step (a);
(g) continuously concentrating the radionuclides and nonvolatile pollutants in the contaminated liquid stream by continuous evaporation that simultaneously produces a first stream comprising the concentrated radionuclides and nonvolatile pollutants and a second water rich vapor phase stream substantially free of minerals, dissolved solids and metals, and comprising the volatile chemically oxidizable pollutants originally present in the contaminated liquid stream;
(h) removing the first stream comprising concentrated radionuclides and nonvolatile pollutants;
(i) contacting substantially all of the second stream with a solid oxidation catalyst in the presence of steam at gas phase oxidation conditions to convert the volatile chemically oxidizable pollutants, thereby producing a gaseous reaction product comprising steam and incondensible gases, the solid oxidation catalyst comprising an inorganic oxide support containing at least one metal oxide;
(j) condensing and scrubbing the steam from step (i) to produce the treated water stream; and,
(k) recycling the treated water from step (j) for mixing with the solids from step (b) and with the mixed waste and extraction solution of Step (2).

5,160,637

APPARATUS AND METHOD FOR HYDROLYSIS OF CYANIDE-CONTAINING LIQUIDS

David H. Bell; Joseph E. F. Fortier, and Haven M. Havens, all of Jonquiere, Canada, assignors to Alcan International Limited, Montreal, Canada

Filed Oct. 19, 1990, Ser. No. 600,516
Int. Cl.[5] C02F *1/66*
U.S. Cl. 210—766 **31 Claims**



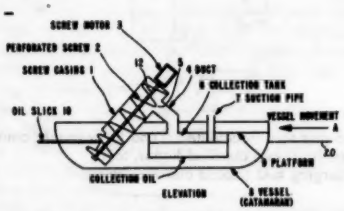
1. An apparatus for continuous thermal hydrolysis of cyanide ions and cyanide-containing ions contained in a alkaline liquid, comprising:
an elongated substantially vertical tubular reactor of a size selected to enable to cyanide-containing alkaline liquid to be retained in the reactor for a predetermined reaction time to allow continuous processing of the liquid;
a conduit for supplying the cyanide-containing alkaline liquid to the reactor; and
means, associated with said conduit, for instantly and uniformly heating said liquid to a preselected temperature to continuously hydrolyze said cyanide-containing liquid substantially without accumulation of scale in said elongated substantially vertical tubular reactor.

5,160,638

OIL SPILL CLEANING SCREW

Tony Petkovic, 107 - 1502 Island Park Walk, Vancouver, British Columbia, Canada V6H 3Z8

Continuation-in-part of Ser. No. 460,382, Jan. 3, 1990, abandoned. This application Jan. 11, 1991, Ser. No. 640,229
Int. Cl.[5] E02B *15/04*
U.S. Cl. 210—776 **1 Claim**



1. A method of collecting oil from a surface of water, comprising:
(a) providing a buoyant vessel, having forward and rearward ends, for supporting on said surface of water a screw casing, a helical screw mounted for rotation in said screw casing about a central axis and means for rotating said screw in said casing, whereby said screw casing is supported at an oblique angle to said surface of water; said screw casing being hollow, cylindrical and having an inner surface, a forwardly-facing lower opening and an upper opening for evacuation of said oil, whereby said lower opening of said screw casing is partially submerged below said surface of water, said screw comprising a screw vane having an outer edge;
wherein said screw casing closely encases said screw so as to form a rotating fluid seal between said inner surface of said casing and said rotatably mounted screw, and wherein said vane of said screw comprises oil-separating perforations for retaining said oil on the upper surface of said vane while allowing said water to flow therethrough;
(b) moving said vessel forwardly on the surface of said water in a direction in the same plane as the axis of rotation of the screw;
(c) rotating said screw in said casing to raise and separate said oil from said water; and
(d) collecting said oil from said upper opening in a storage reservoir.

5,160,639

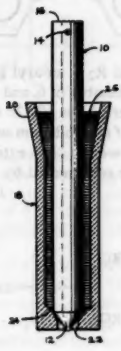
LIME-TREE PREFORMED SHAPES FOR CASTING ALUMINUM

J. Michael McCollum, 2608 Matterhorn Dr., Wexford, Pa. 15090

Continuation of Ser. No. 477,053, Feb. 7, 1990, abandoned. This application Jun. 17, 1991, Ser. No. 719,067
Int. Cl.[5] C04B *35/02*
U.S. Cl. 222—591 **14 Claims**

1. An amorphous silica shape used in the casting of molten aluminum, comprising: 2 to 10 wt. % of an alkali phosphate

modified alumino-silicate binder wherein said binder develops adequate strength for handling and service conditions after



simple drying and accommodates the use of plastic and non-plaster molds.

5,160,640

FORMWORK PANEL

Johann Badstieber, Rutesheim, Fed. Rep. of Germany, assignor to Josef Maier, Steinach, Fed. Rep. of Germany

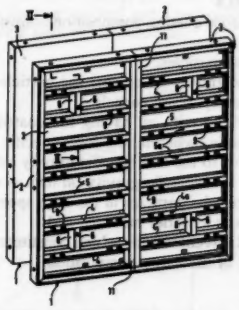
PCT No. PCT/DE89/00654, § 371 Date May 13, 1991, § 102(e) Date May 13, 1991, PCT Pub. No. WO90/05224, PCT Pub. Date May 17, 1990

PCT Filed Oct. 14, 1989, Ser. No. 679,040

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1988, 3838488

Int. Cl.[5] E04G 9/02

U.S. Cl. 249—189 29 Claims



1. A formwork panel, comprising a face member having a front forming face, an opposite back surface, and peripheral marginal portions; a plurality of spaced, elongated reinforcing members longitudinally disposed against said opposite back surface; and an additional transverse member extending between two selected, adjacent ones of said reinforcing members and being spaced from said peripheral marginal portions, openings being formed in said front forming face, said opposite back surface and said additional member and being arranged to receive a tie element designed to connect said formwork panel to a second formwork panel so as to define a pouring space for flowable material.

5,160,641

DETERGENT COMPOSITION WITH FABRIC SOFTENING PROPERTIES

Francis G. Foster, Merseyside, England, assignor to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Continuation of Ser. No. 443,813, Nov. 29, 1989, abandoned, which is a continuation of Ser. No. 231,621, Aug. 11, 1988, abandoned, which is a continuation of Ser. No. 870,600, Jun. 4, 1986, abandoned. This application Jan. 2, 1991, Ser. No. 635,809

Claims priority, application United Kingdom, Jul. 29, 1985, 8519047

Int. Cl.[5] D06M 10/08, 13/188, 13/46; C11D 3/30

U.S. Cl. 252—8.6 4 Claims

1. A fabric treatment composition comprising

(i) from 5% to 40% by weight of a detergent active material selected from non-soap anionic detergent active materials and mixtures thereof with other non-soap detergent active materials;

(ii) from 2% to 50% by weight of an organic fabric softening agent selected from soaps, fatty amines, fabric softening clays and their derivatives and mixtures thereof; and

(iii) from 0.5 to 3% by weight of a nonionic substituted cellulose ether derivative having an hydrophilic-lipophilic balance of between 3.3 and 3.8, a degree of substitution of 1.9 to 2.9 and a gel point of between 33° C. and 56° C., the cellulose ether derivative being selected from the group consisting of ethyl hydroxyethyl cellulose ethers and methyl hydroxyethyl cellulose ethers.

5,160,642

POLYIMIDE QUATERNARY SALTS AS CLAY STABILIZATION AGENTS

John A. Schield, Chesterfield; Michael I. Naiman, and Gary A. Scherubel, both of St. Louis, all of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed May 25, 1990, Ser. No. 529,026

Int. Cl.[5] E21B 43/26; C07D 207/452; C08F 26/02

U.S. Cl. 252—8.551 22 Claims

1. A composition comprising a quaternary ammonium salt of an imide of a polymer of maleic anhydride selected from the group consisting of homopolymers of maleic anhydride and copolymers of maleic anhydride containing repeating units at least about 90% of which are maleic anhydride.

22. A method of stabilizing a clay-containing formation comprising contacting the formation with a composition comprising a quaternary ammonium salt of an imide of polymaleic anhydride.

5,160,643

METHOD FOR DELAYING THE GELLATION OF BORATED GALACTOMANNANS WITH A DELAY ADDITIVE SUCH AS GLYOXAL

Jeffrey C. Dawson, Katy, Tex., assignor to BJ Services Company, Houston, Tex.

Division of Ser. No. 465,903, Jan. 16, 1990, Pat. No. 5,082,579. This application Dec. 2, 1991, Ser. No. 801,433

The portion of the term of this patent subsequent to Jan. 21, 2009, has been disclaimed.

Int. Cl.[5] E21B 43/26

U.S. Cl. 252—8.551 4 Claims

1. A method of fracturing a subterranean formation comprising the steps of:

blending together an aqueous fluid and a hydratable polymer capable of gelling in the presence of borate ions;

allowing the polymer to hydrate to form a hydrated base fluid;

adjusting the pH of the base fluid to above about 7.8;

forming a complexor solution for the base fluid by combining a cross-linking additive capable of furnishing borate ions in solution with a liquid delay additive, the delay additive being added in an amount effective to chemically

bond in the alkaline pH base fluid with the borate ions produced by the cross-linking additive to thereby limit the number of borate ions available in solution for subsequent cross-linking of the base fluid; and

while maintaining an alkaline pH in the base fluid adding the complexor solution to the base fluid to cross-link the fluid.

5,160,644

LUBRICATING OIL CONTAINING O-ALKYL-N-ALKOXYCARBONYLTHIONOCARBAMATE SALTS OF DIALKYLDITHIOPHOSPHORIC ACID (PNE-614)

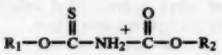
Jacob J. Habeeb, and Morton Beltzer, both of Westfield, N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

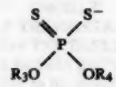
Filed Dec. 12, 1991, Ser. No. 805,759
Int. Cl.[5] C10M *137/08, 137/10*
U.S. Cl. 252—32.7 E **10 Claims**

1. A lubricating oil composition which comprises

(a) a lubricating oil basestock, and

(b) an O-alkyl-N-alkoxycarbonylthionocarbamate salt of dialkyldithiophosphoric acid having the formula





where

R_1 and R_2 are each an alkyl group, an aryl group, an alkaryl group, an arylalkyl group, or substituted derivatives thereof, containing from 1 to 20 carbon atoms, and

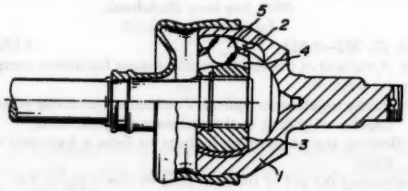
R_3 and R_4 are selected from hydrogen and a hydrocarbyl group containing from 1 to 28 carbon atoms.

5,160,645

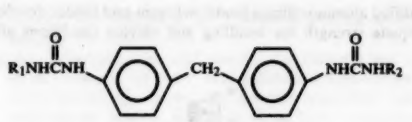
GREASE COMPOSITION FOR CONSTANT VELOCITY JOINT

Takashi Okaniwa, Fujisawa; Kiyoshi Takeuchi, Odawara; Toshiharu Kato, Kakegawa, and Keizo Nagasawa, Iwata, all of Japan, assignors to NTN Corporation, Osaka, Japan

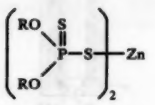
Filed Feb. 18, 1992, Ser. No. 836,544
Claims priority, application Japan, Apr. 30, 1991, 3-124524
Int. Cl.[5] C10M *141/02, 141/06*
U.S. Cl. 252—32.7 E **4 Claims**



1. A grease composition for constant velocity joint comprising a base oil, and containing (A) 5–25% by weight of a diurea compound represented by the following general formula:



wherein each of R_1 and R_2 is an aryl group or a cyclohexyl group having a carbon number of 6, and ratio of the aryl group having a carbon number of 6 is 100-25 mol % as a thickener, (B) 0.5–3% by weight of molybdenum sulfide dialkyldithiocarbamate, (C) 0.5–3% by weight of an extreme pressure additive of zinc dithiophosphate represented by the following general formula:



wherein R is an alkyl group or an aryl group, (D) 0.5–3% by weight of a sulfur-phosphorus series extreme pressure additive containing no metallic element and having a sulfur content of 10–30% by weight and a phosphorus content of 0.5-5% by weight, and (E) 0.5-3% by weight of lead dialkyldithiocarbamate.

5,160,646

PTFE OIL COATING COMPOSITION

John L. Scheld, Wayne, N.J., assignor to Tribophysics Corporation, Wayne, N.J.

Continuation of Ser. No. 716,935, Mar. 28, 1985, abandoned, which is a continuation-in-part of Ser. No. 220,654, Dec. 29, 1980, abandoned. This application Sep. 17, 1987, Ser. No. 97,272
The portion of the term of this patent subsequent to Oct. 22, 2008, has been disclaimed.
Int. Cl.[5] C10M *111/04*
U.S. Cl. 252—32.5 **20 Claims**

1. A non-aqueous coating composition consisting essentially of,

solid lubricant particles,

a low specific gravity oil coating the particles to lower the specific gravity of the particles,

a high specific gravity oil having the coated particles dispersed therein, wherein the high specific gravity oil is high relative to the low specific gravity oil, whereby the coating of low specific gravity oil acts as a buoyant medium to float the particles in the high specific gravity oil which acts as a carrier medium, and

a chlorinated solvent vehicle which constitutes 20 percent to 90 percent of the entire composition.

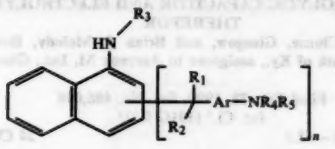
5,160,647

SUBSTITUTED 1-AMINONAPHTHALENES AND STABILIZED COMPOSITIONS

Paul A. Odorisio, Edgewater; David E. Chasan, Teaneck, both of N.J., and Stephen D. Pastor, Danbury, Conn., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 7, 1991, Ser. No. 697,123
Int. Cl.[5] C07C *211/58;* C10M *133/12*
U.S. Cl. 252—47 **13 Claims**

1. A compound of formula I



(I)

wherein

n is 1,

Ar is phenylene or naphthylene,

R_1 and R_2 are independently hydrogen, a straight or branched chain alkyl of 1 to 18 carbon atoms;

R_3 is an aryl group of 6 to 10 carbon atoms substituted by one or two alkyl groups of 1 to 18 carbon atoms,

R_4 is hydrogen, and

R_5 is an aryl group of 6 to 10 carbon atoms substituted by one or two alkyl groups of 1 to 18 carbon atoms.

5. A lubricating oil composition stabilized against oxidative and thermal degradation which comprises

(a) a lubricating oil subject to thermal or oxidative degradation, and

(b) an effective stabilizing amount of a compound of formula I according to claim 1.

5,160,648

HIGH MOLECULAR WEIGHT NITROGEN-CONTAINING CONDENSATES AND FUELS AND LUBRICANTS CONTAINING SAME

Thomas F. Steckel, Chagrin Falls, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Division of Ser. No. 390,439, Aug. 3, 1989, Pat. No. 5,053,152, which is a continuation-in-part of Ser. No. 711,799, Mar. 14, 1985, abandoned. This application Jun. 13, 1991, Ser. No. 714,579

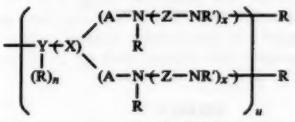
Int. Cl.[5] C10M *133/16, 133/56;* **C07C** *102/04*

U.S. Cl. 252—47.5 **37 Claims**

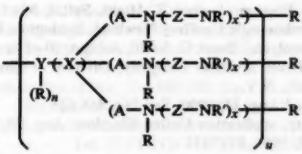
1. A composition of the formula:

$(QT_t)_wJ_j$

wherein Q is a radical of a molecule selected from hydrocarbyl carboxylic acids, or hydrocarbyl phenols, T is acyl, acyloxy, oxyalkylene, arylene or imidoyl and J represents a polyamine radical comprising units of the formula:



or



wherein R is independently hydrogen or C_{1-7} hydrocarbyl; R' is hydrogen, alkyl or $NH_2R''(NR'')_y$, wherein y is a number in the range from 1 to about 6 and R'' is an alkylene group of 1 to about 10 carbon atoms; Y represents N or O; X is an alkylene group; A is hydrocarbyl; Z is alkylene of 1 to about 10 carbon atoms, an oxyalkylene of 1 to about 10 carbon atoms or a heterocyclic ring containing at least one nitrogen atom; x is a number in the range from 1 to about 10; u is an integer greater than 1; and n is 0 or 1; and v and j are independently integers of at least 1.

5,160,649

MULTIFUNCTIONAL ASHLESS DETERGENT ADDITIVES FOR FUELS AND LUBRICANTS

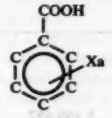
Angeline B. Cardis, Florence; Arjun K. Goyal, Woodbury, both of N.J.; Carl E. Shanholtz, Ft. Ashby, W. Va., and Virginia C. Wiszniewski, Voorhees, N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Oct. 23, 1991, Ser. No. 781,449

Int. Cl.[5] C10M *133/44, 133/58*

U.S. Cl. 252—47.5 **20 Claims**

1. A reaction product having multifunctional ashless detergent, antioxidant and metal surface protection properties in an oil of lubricating viscosity or grease prepared therefrom comprising the reaction product of a hydrocarbylsuccinimide dimer, an aldehyde and a heteroatom-substituted benzoic acid which has the following structural formula:



where X is the heteroatomic group which is a hydroxyl, thiol or a primary or secondary nitrogenous group which is NH_2 or NHR_2 where R_2 is a hydrocarbon group.

5,160,650

MONOALKYLAMINE COMPLEXES OF BORATED HIGHER CARBON NUMBER ALKYL CATECHOLS AND LUBRICATING OIL COMPOSITIONS CONTAINING THE SAME

Vernon R. Small, Jr., Rodeo; Thomas V. Liston, San Rafael, and Anatoli Onopchenko, Concord, all of Calif., assignors to Chevron Research and Technology Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 413,420, Sep. 27, 1989, abandoned. This application Mar. 14, 1991, Ser. No. 669,265

Claims priority, application PCT Int'l Appl., Sep. 14, 1990, PCT/US90/05138

The portion of the term of this patent subsequent to Aug. 25, 2009, has been disclaimed.

Int. Cl.[5] C10M *139/00*

U.S. Cl. 252—49.6 **41 Claims**

1. A composition comprising a complex of a borated alkyl catechol and an amount to hydrolytically stabilize the. borated alkyl catechol of one or mroe monoalkylamines or monoalkanomines having from 2 to 10 carbon atoms and from 0 to 3 hydroxyl groups; wherein said borated alkyl catechol has a molar ratio of alkyl catechol to boron of 1:1 or 3:2 or mixtures thereof and further wherein the alkyl group of said borated alkyl catechol contains at least 10 carbon atoms.

5,160,651

TRIALKYLAMINE COMPLEXES OF BORATED HIGHER CARBON NUMBER ALKYL CATECHOLS AND LUBRICATING OIL COMPOSITIONS CONTAINING THE SAME

Vernon R. Small, Jr., Rodeo; Thomas V. Liston, San Rafael, and Anatoli Onopchenko, Concord, all of Calif., assignors to Chevron Research and Technology Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 553,487, Jul. 13, 1990, abandoned, which is a continuation-in-part of Ser. No. 407,602, Sep. 15, 1989, abandoned. This application Mar. 14, 1991, Ser. No. 669,262

Claims priority, application World Int. Prop. O., Sep. 14, 1990, PCT/US90/05138

The portion of the term of this patent subsequent to Jul. 30, 2008, has been disclaimed.

Int. Cl.[5] C01M *139/00*

U.S. Cl. 252—49.6 36 Claims

1. A composition comprising a complex of a borated alkyl catechol and an amount to hydrolytically stabilize the borated alkyl catechol of one or more trialkylamines of hydroxy-substituted trialkylamine having from 3 to 27 carbon atoms and from 0 to 3 hydroxyl groups wherein the alkyl groups of said trialkylamine or hydroxy-substituted trialkylamine are aliphatic or alicyclic hydrocarbon radicals; and wherein said borated alkyl catechol has a molar ratio of alkyl catechol to boron of about 3:2 and further wherein the alkyl group of said borated alkyl catechol contains at least 10 carbon atoms.

5,160,652

DIALKYLAMINE COMPLEXES OF BORATED HIGHER CARBON NUMBER ALKYL CATECHOLS AND LUBRICATING OIL COMPOSITIONS CONTAINING THE SAME

Vernon R. Small, Jr., Rodeo; Thomas V. Liston, San Rafael, and Anatoli Onopchenko, Concord, all of Calif., assignors to Chevron Research and Technology Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 407,833, Sep. 15, 1989, abandoned. This application Mar. 14, 1991, Ser. No. 669,180

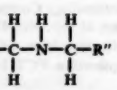
Claims priority, application PCT Int'l Appl., Sep. 14, 1990, PCT/US90/05138

The portion of the term of this patent subsequent to Dec. 4, 2007, has been disclaimed.

Int. Cl.[5] C10M *139/00*

U.S. Cl. 252—49.6 35 Claims

1. A composition comprising a complex of a borated alkyl catechol and an amount to hydrolytically stabilize the borated alkyl catechol of one or more secondary amines having the formula:



where R′ is phenyl or an aliphatic hydrocarbon radical having from 2 to 9 carbon atoms; and R″ is selected from the group consisting of hydrogen, phenyl, and an aliphatic hydrocarbon radical having from 1 to 9 carbon atoms and wherein said aliphatic carbon atoms of R′ or R″ or both can optionally form a 5- or 6-membered alicyclic ring with the alpha carbon atom; and wherein the total number of carbon atoms in R′ plus R″ is no more than 16; and wherein said borated alkyl catechol has a molar ratio of alkyl catechol to boron of 1:1 or 3:2 or mixtures thereof and further wherein the alkyl group of said borated alkyl catechol contains at least 10 carbon atoms.

5,160,653

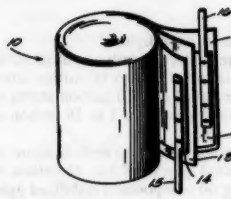
ELECTROLYTIC CAPACITOR AND ELECTROLYTE THEREFOR

James A. Clouse, Glasgow, and Brian J. Melody, Bowling Green, both of Ky., assignors to Aerovox M, Inc., Glasgow, Ky.

Filed Feb. 28, 1990, Ser. No. 486,076

Int. Cl.[5] H01G *9/02*

U.S. Cl. 252—62.2 24 Claims



1. A liquid electrolyte for an electrolytic capacitor comprising:

(a) a solvent portion comprising

(i) one or more N-substituted pyrrolidones in the amount of at least 40% by weight of the liquid electrolyte; and

(ii) water in the range of about 0.2 to about 8% by weigh of the liquid electrolyte;

(b) a solute portion comprising

(i) an amine salt, comprising an acid portion and an amine portion,

(A) said acid portion comprising a dicarboxylic acid with 6 to 40 carbons and present at a level of about 0.1 to 4 moles per kilogram of solvent, and

(B) said amine portion being selected from the group consisting of tertiary amines and relatively nonreactive secondary amines and present at a level of about 0.2 to 4 moles of active amine nitrogen per mole of dicarboxylic acid; and

(ii) boric acid in an amount sufficient to provide a molar ratio of uncomplexed borate ion to dicarboxylic acid of between about 0.1 and about 1.2; and

(c) less than about 0.5% phosphate.

5,160,654

LAUNDRY TREATMENT PRODUCT

Mohamad S. Falou, Cheadle; Timothy D. Finch, Wirral; Peter F. Garner-Gray, Preston; Andrew T. Hight, Spital; Martin M. Murphy, Bromborough; Geoffrey Newbold, Bebington; Ian E. Niven, Liverpool, and Derek G. Savill, Ashton, all of England, assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Aug. 13, 1990, Ser. No. 566,635

Claims priority, application United Kingdom, Aug. 23, 1989, 8919120; Dec. 3, 1989, 8927433

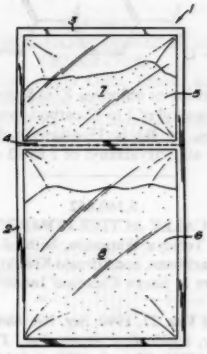
The portion of the term of this patent subsequent to Jul. 21, 2009, has been disclaimed.

Int. Cl.[5] C11D *17/00, 7/18;* C09K *3/00*

U.S. Cl. 252—91 7 Claims

1. A laundry treatment product in a sachet form capable of releasing contents of the sachet into a wash liquor during laundering, the sachet containing a particulate bleaching detergent composition and having at least two compartments,

wherein a first compartment contains sodium percarbonate, optionally in admixture with other compatible detergent ingredients, and a second compartment containing a bleach activator which is cholyl-4-sulphophenyl carbonate.



5,160,655

AQUEOUS STRUCTURED LIQUID DETERGENT COMPOSITIONS CONTAINING SELECTED PEROXYGEN BLEACH COMPOUNDS

Cornelis B. Donker, Dordrecht, Netherlands; Michael Hull, Helsby, Great Britain, and Johannes C. van de Pas, Vlaardingen, Netherlands, assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Continuation of Ser. No. 673,174, Mar. 18, 1991, abandoned, which is a continuation of Ser. No. 479,326, Feb. 13, 1990, abandoned. This application Nov. 15, 1991, Ser. No. 794,618

Claims priority, application European Pat. Off., Feb. 27, 1989, 89200492.0; United Kingdom, Apr. 13, 1989, 8908412

Int. Cl.[5] C11D *3/395, 7/18, 7/54*

U.S. Cl. 252—95 **19 Claims**

1. An aqueous structured liquid detergent composition consisting essentially of detergent active materials and a soluble or partially soluble peroxygen bleach compound selected from the group consisting of hydrogen peroxide, peroxyacids, perborates, persulfates, peroxydisulfates, perphosphates and peroxyhydrates formed by reacting hydrogen peroxide with urea or alkali metal carbonate, said detergent composition having a pH between 6.5 and about 11 and showing less than 10% volume increase while stored at a temperature between 20° and 37° C. for three months after preparation.

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AQUEOUS LIQUID BLEACHING DETERGENTS WHICH ARE STABLE DURING STORAGE AND WASHING PROCESS

Henry Carron, Pantin, and Eric Jourdan-LaForte, Paris, both of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Continuation of Ser. No. 340,631, Apr. 20, 1989, abandoned. This application Nov. 13, 1990, Ser. No. 614,050

Claims priority, application France, Apr. 22, 1988, 88 05335

Int. Cl.[5] C11D *3/42, 3/06, 3/43*

U.S. Cl. 252—99 **4 Claims**

1. A homogeneous aqueous liquid bleaching detergent stable in alkaline media comprising at most 20% by weight of monohydrated sodium perborate, a stabilizing agent comprising a mixture of a Mg3.5 SiO_2 synthetic magnesium silicate present in amounts of from about 0.1% to about 2.5% by weight and a sodium acid pyrophosphate present in amounts of from about 0.5 to about 10% by weight, and a viscosity regulator comprising dialkylether polyethylene glycol copolymers present in amounts of from about 0.5 to about 7.5% by weight.

4. A process for washing and bleaching laundry comprising adding to wash water a liquid bleaching detergent according to claim 1, wherein the temperature of the wash water is between about 40° and about 60° C.

5,160,657

DETERGENT COMPOSITIONS AND PROCESS FOR PREPARING THEM

Fabrizio Bortolotti, Piacenza; Luciano Pietrantoni, Somaglia, both of Italy; Petrus L. J. Swinkels, Vlarrdingen, and Marco Waas, Rotterdam, both of Netherlands, assignors to Lever Brothers Company, Division of Conopo, Inc., New York, N.Y.

Filed Mar. 19, 1990, Ser. No. 495,549

Claims priority, application United Kingdom, Mar. 17, 1989, 8907187

The portion of the term of this patent subsequent to Jul. 28, 2009, has been disclaimed.

Int. Cl.[5] C11D *11/00, 3/10, 3/12;* **B29C** *67/00*

U.S. Cl. 252—174.14 **11 Claims**

1. Process for the continuous preparation of a granular detergent composition or component having a bulk density of at least 650 g/l, which comprises:

(i) in a first step mixing a particulate starting material having one or more detergent active materials and one or more builders in a high-speed mixer/densifier, the mean residence time being from about 5–30 seconds to obtain a powder;

(ii) in a second step mixing said powder in a moderate-speed granulator/densifier, said powder thereby being brought into, or maintained in, a deformable state, said mixing of the powder in said deformable state reducing the intraparticle porosity of said powder, the mean residence time being from about 1–10 minutes and;

(iii) in a final step drying and/or cooling said powder, whereby 0.1 to 40% by weight of a second powder is added in the second step or between the first and the second step, said second powder having a particle size of 2 to 50 μm and being selected from the group consisting of fine zeolite powder, sodium carbonate and amorphous calcium silicate.

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SURFACTANT COMPOSITIONS

Kim R. Smith; James E. Borland; Terry Crutcher, and Joe D. Sauer, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Nov. 7, 1991, Ser. No. 788,814

Int. Cl.[5] C11D *1/18*

U.S. Cl. 252—174.19 **5 Claims**

1. A surfactant mixture consisting of 55–95% by weight of an amine oxide corresponding to the formula RR'R"NO in which R is a primary alkyl group containing 6–24 carbons and R' and R" are independently selected from the group consisting of methyl, ethyl, and 2-hydroxyethyl and 45–5% by weight of an alkylphenoxysulfosuccinate in which the alkyl group contains 8–18 carbons.

5,160,659

PASTE FOR THE VIBRATION FILLING OF FOAM-STRUCTURE AND FIBER-STRUCTURE ELECTRODE PLATES FOR GALVANIC CELLS

Klaus von Benda, Nurtingen, and Gabor Benczur-Urmossy, Stuttgart, both of Fed. Rep. of Germany, assignors to Deutsche Automobilgesellschaft mbH, Fed. Rep. of Germany

Division of Ser. No. 350,403, May 11, 1989, Pat. No. 4,974,644. This application Nov. 28, 1990, Ser. No. 619,018

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816232

The portion of the term of this patent subsequent to Jul. 10, 2007, has been disclaimed.

Int. Cl.[5] H01M *4/32*

U.S. Cl. 252—182.1 **4 Claims**

1. A paste having an active substance for vibration filling of foam-structure or fiber-structure electrode plates for galvanic cells, said paste having

an active substance content in the range of from approximately to 25 to 60 percent by volume;

maximum active particle size of approximately 0.04 mm; and mm; and

in the unvibrated state, having a yield value in the range of about 10 to 120 Pa and a plastic viscosity in the range of about 0.1 to 1 Pa.s at about 20° C.; and

said paste having a dispersing agent selected from the group of water-soluble salts of polyphosphoric acid.

5,160,660

DIHALOHYDANTOIN BLEACH

Raymond T. Ertle, Pompton Plains, and Robert P. Arbaugh, Westampton, both of N.J., assignors to Cap City Products Co. Inc., Kearny, N.J.

Continuation-in-part of Ser. No. 776,637, Sep. 16, 1985, Pat. No. 4,973,424. This application Aug. 27, 1990, Ser. No. 573,547

Int. Cl.[5] C01B *21/083*

U.S. Cl. 252—186.34 **13 Claims**

1. An improved dry powder composition for use in aqueous solution in the bleaching and sanitizing of fabrics, which will cause minimal fabric or fabric dye damage upon direct contact of the concentrated composition with damp or wet fabric, said composition comprising:

a first component comprising a dry dialkyldihalohydantoin, which in aqueous solution provides a source of available bleaching and sanitizing chlorine; and

a second component comprising an inhibiting system in an effective amount to inhibit the activity of available chlorine from the first component such that fabric or fabric dye degradation is beneath a predetermined level when the concentration of the first component of the composition is above saturation with respect to the aqueous solvent; said inhibiting system comprising 5,5-dimethylhydantoin, and one or more dry acidifying agents which function to buffer a 50% aqueous solution/suspension of said composition to a pH of 5.0 or below,

the weight ratio of said acidifying agent being in the range of from 0.5 to 10 parts, per 10 parts of total combined dialkyldihalohydantoin and dimethylhydantoin.

5,160,661

DIOXANYLPYRIDINE

Martin Schadt, Seltisberg, and Alois Villiger, Basel, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

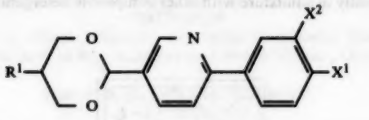
Filed Dec. 3, 1990, Ser. No. 620,818

Claims priority, application Switzerland, Dec. 22, 1989, 4623/89

Int. Cl.[5] C09K *19/34*; G02F *1/13*; C07D *405/04*

U.S. Cl. 252—299.61 **12 Claims**

9. A liquid crystalline mixture comprising at least two components, wherein at least one of said components is a compound of the formula



wherein X^1 is fluorine or chlorine, X^2 is hydrogen, fluorine or chlorine; and R^1 is alkyl of 1 to 12 carbon atoms, alkoxy of 2 to 12 carbon atoms, or R^1 is 1E-alkenyl, alkoxyalkenyl, alkenyloxyalkyl or alkyloxyalkenyl of 2 to 12 carbon atoms.

5,160,662

OPTICALLY ACTIVE COMPOUNDS

Masahiro Satoh; Tetsuya Watanabe, both of Kyoto; Kunikiyo Yoshio, Ohmihachiman, and Hiroshi Kishiki, Takatsuki, all of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

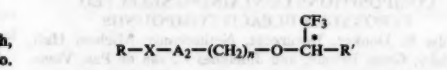
Filed Feb. 27, 1990, Ser. No. 486,008

Claims priority, application Japan, Feb. 27, 1989, 1-47948; Feb. 27, 1989, 1-47949; Mar. 1, 1989, 1-49468; Mar. 1, 1989, 1-49469; Mar. 1, 1989, 1-49470; Jul. 25, 1989, 1-192061; Nov. 17, 1989, 1-299928; Nov. 22, 1989, 1-303851

Int. Cl.[5] C09K *19/34, 19/32, 19/12*; C07D *239/02*

U.S. Cl. 252—299.61 **11 Claims**

1. An optically active compound having the formula (2):



(2)

wherein R and R′ are the same or different alkyl groups containing 1 to 20 carbon atoms, which are each unsubstituted or are substituted with at least one substitutent selected from the group consisting of F, Cl and alkoxy groups; X is a direct bond or —O—; A_2 is Bp, Nt, Pym-Ph, Ph-Pym, A_1-Y_2-Pyr or A_4-Y_2-A_5; A_1 is a cyclic group selected from the group consisting of Ph, Bp and Nt; Y_2 is CH_2CH_2 or C≡C; A_4 is Ph or Bp; A_5 is Ph; n is 0 or an integer of 1 to 5; Ph, Pyr, Pym, Bp and Nt represent 1,4-phenylene, 2,5-pyridylene, 2,5-pyrimidinylene, p,p′-biphenylene and 2,6-naphthylene groups, respectively, which are unsubstituted or F-substituted.

5,160,663

METHOD OF RECLAIMING LAMP PHOSPHOR

Arunava Dutta, Chestnut Hill, and Leonard V. Dullea, Peabody, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 9, 1991, Ser. No. 805,335

Int. Cl.[5] C09K *11/01, 11/78*

U.S. Cl. 252—301.4 R **14 Claims**

1. A process for the recovery of a fluorescent lamp phosphor product from a degraded aqueous suspension of lamp phosphors comprising a red Y_2O_3:Eu phosphor, a blue $BaMg_2Al_{1.6}O_{27}$:Eu phosphor, and a green $(Ce,Tb)MgAl_{11}O_{19}$:Ce,Tb phosphor and a decomposed portion of said red Y_2O_3:Eu phosphor in the form of a scum layer including yttrium hydroxide on the surface of said phosphors comprising the steps of a) separating a liquid portion of the degraded aqueous phosphor suspension from a solids portion containing said decomposed europium activated yttrium oxide phosphor, b) treating said solids portion with nitric acid at a sufficient concentration and in a sufficient amount to solubilize said decomposed portion of said europium activated yttrium oxide phosphor to form an aqueous acid by-product, c) separating said aqueous acid by-product containing said solubilized decomposed portion of said europium activated yttrium oxide phosphor from a remaining solids portion comprising a mixture of said phosphors, d) drying and heating said mixture of phosphors in an oxygen containing atmosphere at a temperature of about 450°

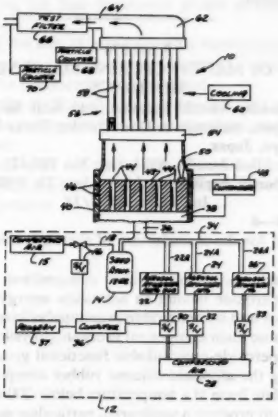
C. to about 55° C. to form a fluorescent lamp phosphor product in which the phosphors contained therein are reconstituted to their chemical and physical form prior to degradation.

5,160,664

HIGH OUTPUT MONODISPERSE AEROSOL GENERATOR

Benjamin Y. H. Liu, North Oaks, Minn., assignor to MSP Corporation, Minneapolis, Minn.

Filed May 31, 1991, Ser. No. 708,306
Int. Cl.[5] C09K 3/30; B01F 5/02
U.S. Cl. 252—305 14 Claims



1. A high output monodisperse aerosol generator having a capability of providing a plurality of different particle size aerosol at an output comprising:

a first atomizer;

at least second and third atomizers;

said first atomizer comprising a solution of a solid particle seed material, and said second and third atomizers having different concentrations of liquid aerosol materials, each of which concentrations will form a different size particle in an aerosol after vaporization and subsequent recondensing, the respective atomizers providing the seed material and aerosol material in droplet form in a gaseous suspension as atomize outputs;

means for feeding the output of the seed atomizer, and selectively the output of one of the aerosol atomizers together as a mixture into a heater to cause vaporization of the atomized particles in gaseous suspension; and

a condenser receiving the mixed vaporized atomizer outputs from the heater, to condense the aerosol material, the seed material forming nuclei for condensation of the aerosol material to obtain uniform sized particles which selectively are different size when a different one of the second and third atomizers is selected.

5,160,665

AEROSOL COMPOSITION EXHIBITING CRACKLING SOUND USING ALIPHATIC HYDROCARBON PROPELLANTS

Ryoichi Owada, Yawata; Satoshi Mekata, Hirakata, and Kunio Ohguri, Kasukabe, all of Japan, assignors to Osaka Aerosol Industries Corporation, Osaka, Japan

Filed Dec. 20, 1989, Ser. No. 453,887
Claims priority, application Japan, Dec. 27, 1988, 1-334975; May 25, 1989, 2-134028
Int. Cl.[5] B01J 13/00; A61K 9/12
U.S. Cl. 252—307 5 Claims

1. An aerosol composition comprising: an aqueous solution of a propellant consisting of one or more aliphatic hydrocarbons having a boiling point of −5° to +40° C. in an amount sufficient to propel the composition from an aerosol container; and a surface active agent, wherein the amount of water in the aqueous solution is 1–54% by weight wherein said composition forms a foam exhibiting a crackling sound upon defoaming when subjected to discharge from an aerosol container in the form of a mist or foam.

5,160,666

LIQUID PRESERVATIVES

Wolfgang Lindner, Seelze; Hans-Ulrich Neuber, and Erich Taschenbrecker, both of Wunstorf, all of Fed. Rep. of Germany, assignors to Riedel-De Haen AG, Seelze, Fed. Rep. of Germany

Filed Apr. 2, 1990, Ser. No. 502,859
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1989, 3911808
Int. Cl.[5] C07G 303/00; A23J 7/00
U.S. Cl. 252—402 8 Claims

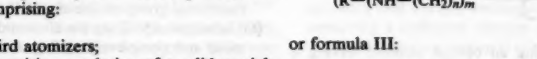
1. A liquid preservative composition comprising

A. 1 to 24.5 % by weight of 1,2-benzisothiazolin-3-one or a salt of this compound,

B. 0.1 to 7 % by weight of an alkyl(polyaminoalkyl)-glycine compound or mixtures thereof having the following formula I:

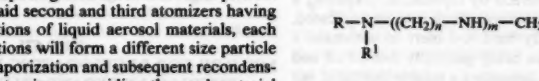
$$R{-}(NH{-}(CH_2)_n)_m{-}NH{-}CH_2{-}COOH \quad (I)$$

or formula II:



$$\begin{matrix}(R{-}(NH{-}(CH_2)_n)_m \\ \qquad\qquad\qquad\rangle N{-}CH_2COOH \\ (R{-}(NH{-}(CH_2)_n)_m\end{matrix} \quad (II)$$

or formula III:



$$\begin{matrix}R{-}N{-}((CH_2)_n{-}NH)_m{-}CH_2{-}COOH \\ \quad\;|\\ \quad R^1\end{matrix} \quad (III)$$

or a salt of one of the compounds of formula I, II or III, dissolved in water or in at least one water-miscible solvent or in a mixture of water and at least one water-miscible solvent, wherein the weight ratio of A:B is 3.5 to 100:1 and

R denotes C_8 to C_{18}-alkyl,

R^1 denotes $((CH_2)_n{-}NH)_m{-}(CH_2)_n{-}NH_2$,

n denotes 2, 3 or 4 and

m denotes 1, 2, 3, 4 or 5.

5,160,667

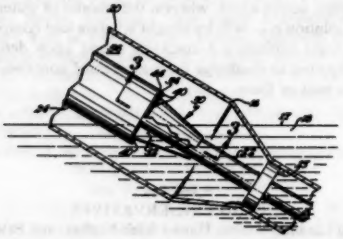
BEARING PROTECTION DEVICE FOR LIQUID AERATORS

Peter S. Gross, Plymouth; Eric Bollensen, Columbia Heights, and Richard Rajendren, Belle Plaine, all of Minn., assignors to Aeromix Systems, Incorporated, Minneapolis, Minn.

Filed Aug. 26, 1991, Ser. No. 749,643
Int. Cl.[5] B01F 3/04
U.S. Cl. 261—91 10 Claims

1. In an apparatus for the treatment of liquids by aeration of the type having a motor, a propeller carried by a motor driven shaft, means defining an airflow passage to the propeller, and bearing means supporting the shaft at least one location spaced from the motor, the improvement comprising:

means establishing an air pocket about at least one bearing means for blocking liquid from the bearing means, the



blocking means including an aperture which opens into the airflow passage and beneath the surface of the liquid.

5,160,668

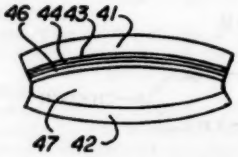
METHOD FOR FORMING OPTICAL ELEMENTS HAVING AN OPTICAL COATING BY REPLICATION OF A MOLD

Mark H. Imus, Sausalito, Calif., assignor to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Continuation of Ser. No. 446,482, Dec. 5, 1989, abandoned. This application Aug. 28, 1991, Ser. No. 758,297

Int. Cl.[5] B29D *11/00*

U.S. Cl. 264—1.7 **6 Claims**



1. In a method for forming an optical element having a multilayer optical coating thereon by replication, preparing a first mold having a polished surface which is to be replicated, said surface being sufficiently hard and inert to withstand a casting operation, the surface being generally free of oil and large dust particles, vacuum depositing a soluble inorganic salt to form an optical release layer having an optical thickness, depositing a multilayer optical coating in reverse order upon the release layer, supplying liquid material to the mold and in contact with the optical coating, causing the liquid material to solidify and form a bond with the optical coating, separating the mold from the solidified material with the optical coating adherent to the solidified material with separation occurring between the mold and the optical coating at the release layer and removing the release layer from the optical coating.

5,160,669

METHOD OF MAKING OIL FILLED PAUCILAMELLAR LIPID VESICLES

Donald F. H. Wallach, Hollis, and Rajiv Mathur, Nashua, both of N.H., assignors to Micro Vesicular Systems, Inc., Nashua, N.H.

Continuation-in-part of Ser. No. 410,650, Sep. 21, 1989, Pat. No. 5,019,174, which is a continuation-in-part of Ser. No. 157,571, Mar. 3, 1988, Pat. No. 4,911,928, and a continuation-in-part of Ser. No. 443,516, Nov. 29, 1989, which is a division of Ser. No. 157,571,. This application Oct. 16, 1990, Ser. No. 598,120

The portion of the term of this patent subsequent to May 28, 2008, has been disclaimed.

Int. Cl.[5] A61K *9/127*; B01J *13/20*

U.S. Cl. 264—4.3 **10 Claims**

1. A method of forming a paucilamellar lipid vesicle having a substantially oil-filled amorphous central cavity comprising the steps of:

preforming a paucilamellar lipid vesicle having an aqueous material in the amorphous central cavity;

mixing said preformed paucilamellar lipid vesicle with a water immiscible material to be incorporated into said central cavity under mixing conditions such that said water immiscible material is incorporated into said preformed vesicle; and

separating said paucilamellar lipid vesicle from any of said water immiscible material not incorporated into said central cavity,

whereby said amorphous central cavity of said paucilamellar lipid vesicle is substantially filled with said water immiscible material.

5,160,670

METHOD OF MANUFACTURING SILICONE RUBBER MOLDINGS

Mitsuo Hamada; Atsushi Sakuma, and Koji Shimizu, all of Chiba, Japan, assignors to Dow Corning Toray Silicone Co., Ltd., Tokyo, Japan

Filed Jun. 24, 1991, Ser. No. 719,421

Claims priority, application Japan, Jun. 25, 1990, 2-164221

Int. Cl.[5] C08K *3/34*

U.S. Cl. 264—6 **12 Claims**

1. Method for the manufacture of silicone rubber moldings comprising

(A) preparing a silicone rubber composition by blending organoperoxide having an activation energy of 25 to 41 kcal/mol into a semicurable organopolysiloxane composition whose main component is organopolysiloxane having organoperoxide-crosslinkable functional groups;

(B) curing the aforesaid silicone rubber composition into a particulate form at a temperature below 100 degrees Centigrade to produce a semicured, particulate molding material which retains the activity of the aforesaid organoperoxide and which contains residual crosslinkable functional group on the aforesaid organopolysiloxane; and

(C) subsequently filling the aforesaid molding material into a mold and completely curing at a temperature of at least 100 degrees Centigrade under the application of pressure.

5,160,671

METHOD FOR REGENERATING MANDREL MADE OF THERMALLY EXPANDABLE FLUORORESIN

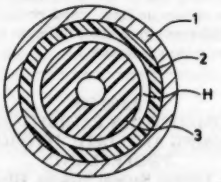
Hajime Satoh, Hiratsuka, Japan, assignor to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Oct. 16, 1991, Ser. No. 777,047

Claims priority, application Japan, Nov. 9, 1990, 2-302612

Int. Cl.[5] B29C *61/04*

U.S. Cl. 264—36 **8 Claims**



1. A method for regenerating a mandrel made of a thermally expandable fluororesin, which comprises the step of heating a used mandrel made of a fluororesin under substantially unloaded conditions to a temperature above the temperature at which the fluororesin is crystallized and gradually cooling said mandrel to a temperature below the temperature at which the fluororesin is crystallized.

8. A method of molding a plurality of fiber reinforced plastic products in succession using a single mandrel, comprising steps of

(a) placing a hollow preform made of a fiber reinforced plastic molding material in an outer die,

(b) inserting a mandrel made of thermally expandable fluororesin into the hollow part of the preform,

(c) heating the whole to cause thermal expansion of the mandrel, thereby clamping the preform between the mandrel and the outer die to form a fiber reinforced plastic product,

(d) rapidly cooling the whole to solidify the preform thus treated and shrink the mandrel,

(e) withdrawing the shrunk mandrel,

(f) removing the fiber reinforced plastic product from the outer die,

(g) heating the shrunk mandrel under substantially unloaded conditions to a temperature above the temperature at which the fluororesin is crystallized,

(h) gradually cooling the heated mandrel to a temperature below the temperature at which the fluororesin is crystallized, and

(i) repeating steps (a) through (h) using the same mandrel used in steps (a) through (h) and a new hollow preform for each repetition.

5,160,672

METHOD FOR PRODUCTION OF HOLLOW FIBER MEMBRANE

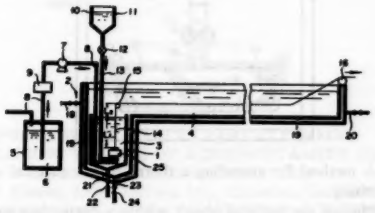
Masatomi Sasaki; Nobuyoshi Kashiwagi; Hiroki Sakakibara, and Makoto Saruhashi, all of Fuji, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,618

Claims priority, application Japan, May 30, 1988, 1-130401; May 18, 1989, 1-122838

Int. Cl.[5] B29C *67/20;* D01D *5/24;* D01F *1/08, 2/00*

U.S. Cl. 264—41 **16 Claims**



1. A method for the production of a hollow fiber membrane by the steps of discharging a spinning dope through an annular spinning nozzle and, at the same time, introducing a non-coagulating liquid for the spinning dope into the central cavity in a hollow fiber of the spinning dope being discharged, and then introducing the discharged fiber of the spinning dope into a coagulating liquid thereby solidifying the discharged fiber into a hollow fiber membrane, which method comprises incorporating a surface modifying agent having both a hydrophilic moiety and a hydrophobic moiety in said non-coagulating liquid thereby modifying the inner surface behavior of the produced hollow fiber membrane.

5,160,673

HOLLOW FIBER MODULE

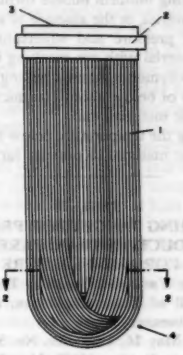
Rudi Wollbeck, Erlenbach, and Thomas Zang, Goldbach, both of Fed. Rep. of Germany, assignors to Akzo N.V., Arnhem, Netherlands

Division of Ser. No. 353,068, May 17, 1989. This application Mar. 5, 1991, Ser. No. 665,490

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1988, 3839966

Int. Cl.[5] B01D *67/00, 69/08;* D01D *5/24;* D01F *1/08*

U.S. Cl. 264—45.1 **3 Claims**



1. A process comprising making a hollow fiber module having a shape alternative to a very pronounced pear-shape, the process comprising:

successively arranging said hollow fibers into part bundles of fibers;

embedding the ends of said part bundles of fibers into a curable sealing compound;

allowing said curable sealing compound to solidify; and

removing a sufficient amount of said curable sealing compound such that said ends of said hollow fibers of said part bundles of said fibers are exposed.

3. An apparatus comprising means for making a hollow fiber module having a shape alternative to a very pronounced pear-shape, said means comprising:

a bottom plate;

a bar having an upper end and a lower end, said lower end being connected perpendicularly to said bottom plate;

a hemispherical cap affixed to said upper end of said bar; and

at least six upwardly projecting rods uniformly distributed on said hemispherical cap.

5,160,674

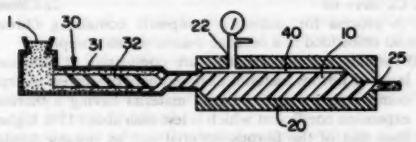
MICROCELLULAR FOAMS OF SEMI-CRYSTALINE POLYMERIC MATERIALS

Jonathan S. Colton, Atlanta, Ga., and Nam P. Suh, Sudbury, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 79,251, Jul. 29, 1987, abandoned. This application Mar. 22, 1990, Ser. No. 497,821

Int. Cl.[5] B29C *67/22*

U.S. Cl. 264—50 **11 Claims**



1. A method of producing a foamed semi-crystalline poly-

meric material containing uniform closed-cell microcellular voids, comprising the steps, performed in the following sequence, of:

a) first, heating a semi-crystalline polymeric material to a temperature at or above the melting temperature of the material to thereby melt the polymeric material;

b) second, saturating the melted polymeric material at an elevated pressure at or above the melting temperature with a uniform concentration of gas;

c) third, shaping the gas saturated polymeric material in a cavity, mold or die at an elevated pressure to substantially prevent cell nucleation within the material;

d) fourth, initiating uniform bubble formation in the shaped polymeric material, in the absence of sonic vibrations, by reducing the pressure and supersaturating the shaped polymeric material with gas resulting in a uniform nucleated shaped polymeric material having closed-cell, microcellular voids of below about 100 microns in diameter in said polymeric material; and

e) fifth, lowering the temperature below the melting point of said polymeric material to prevent further cell growth.

5,160,675

SPUTTERING TARGET FOR PRODUCING ELECTROCONDUCTIVE TRANSPARENT FILMS AND PROCESS FOR MANUFACTURE THEREOF

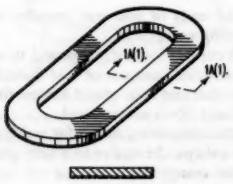
Tetsushi Iwamoto; Yasunobu Yoshida; Toshiaki Furuto, and Koichi Sudo, all of Yamagata, Japan, assignors to Tosoh Corporation, Shinnanyo, Japan

Filed May 16, 1989, Ser. No. 352,473

Claims priority, application 17136, May 16, 1988, 63-117136; Japan, May 16, 1988, 63-117137; May 16, 1988, 63-117138

Int. Cl.[5] C04B *33/28*

U.S. Cl. 264—56 **7 Claims**



1. A process for manufacturing a sputtering target for producing electroconductive transparent films containing indium oxide and tin oxide, which comprises the steps:

(i) molding a shape comprising indium oxide and tin oxide by a slurry casting process; and

(ii) sintering said shape.

5,160,676

FIBROUS MATERIAL-CONTAINING COMPOSITE

Raj N. Singh, Schenectady, and Achuta R. Gaddipati, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 322,849, Mar. 14, 1989, abandoned, which is a division of Ser. No. 132,753, Dec. 14, 1987, Pat. No. 4,886,682. This application Nov. 3, 1989, Ser. No. 437,155

Int. Cl.[5] C04B *33/34*

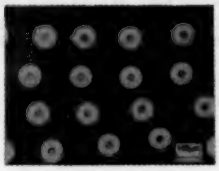
U.S. Cl. 264—60 **22 Claims**

1. A process for making a composite containing fibrous material embedded in a ceramic matrix which comprises:

(a) forming a laminated structure comprising at least one layer of fibrous material disposed between layers of tape comprising a ceramic matrix material having a thermal expansion coefficient which is less than about 15% higher than that of the fibrous material and an organic binder material;

(b) heating the laminated structure to remove the organic binder material; and

(c) hot pressing the resulting laminated structure at a tem-



perature and pressure to consolidate the structure into a composite having a porosity of less than about 5% by volume, at least about 10% by volume of the composite being fibrous material.

5,160,677

PRESSURIZED POWDER SUPPORT FOR TREATING PROCESSES

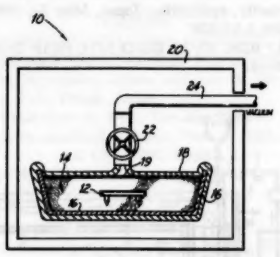
Roy D. Gravener, Southport, and Ross R. Muth, Brookfield, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Continuation of Ser. No. 451,416, Dec. 15, 1989, abandoned. This application May 13, 1991, Ser. No. 701,305

The portion of the term of this patent subsequent to Nov. 3, 2009, has been disclaimed.

Int. Cl.[5] B29C *35/00, 43/12*

U.S. Cl. 264—101 **32 Claims**



1. A method for annealing a thermoplastic surgical object comprising:

a) placing the surgical object within a particulate support medium which comprises an aggregation of substantially rigid particles of sufficiently small size to substantially conform to an outer surface of said surgical object, wherein said surgical object comprises a biocompatible thermoplastic preformed material;

b) creating a difference between the pressure exterior to the aggregation of particles of the particulate support medium and the pressure inside the particulate support medium to compact the support medium into a substantially rigid mass and conform the particulate support medium to the outer surface of said surgical object; and then

c) applying heat for annealing the surgical object.

5,160,678

PRESSURIZED POWDER SUPPORT FOR TREATING PROCESSES

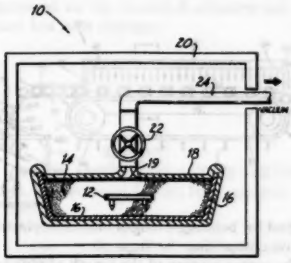
Roy D. Gravener, Southport, and Ross R. Muth, Brookfield, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Continuation of Ser. No. 451,416, Dec. 15, 1989, abandoned. This application Jan. 18, 1991, Ser. No. 643,911

The portion of the term of this patent subsequent to Nov. 3, 2009, has been disclaimed.

Int. Cl.[5] B29C *35/00, 43/12*

U.S. Cl. 264—101 26 Claims



1. A method for annealing a surgical object comprising:

a) providing a container;

b) placing a particulate support medium with the container, said particulate support medium comprising an aggregation of substantially rigid particles of sufficiently small size to substantially conform to an outer surface of the object;

c) placing an already formed surgical object in said particulate support medium in the container, said support medium thereby providing at least a bottom support for said surgical object, said surgical object being composed of a biocompatible thermoplastic material;

d) placing additional particulate support medium within the container; and thereafter

e) compacting the particulate support medium into a substantially rigid mass to substantially conform to the outer surface of said surgical object, said particulate support medium substantially enveloping said surgical object and supporting the surgical object within the container; and then

f) applying heat for annealing the surgical object.

5,160,679

PROCESS FOR MAKING PARTICLE BOARD INCLUDING THE USE OF ACETOACETAMIDE AS A FORMALDEHYDE SCAVENGER

Jack T. Greene, 1302 Chalbena Ave., Columbus, Ga. 31907

Continuation-in-part of Ser. No. 400,096, Aug. 29, 1989, abandoned. This application Apr. 1, 1991, Ser. No. 678,136

Int. Cl.[5] B27N *3/00*

U.S. Cl. 264—109 3 Claims

1. In the process of manufacturing composition board wherein wood particles are treated with a urea formaldehyde adhesive resin and then cured under acidic and curing temperature conditions, the improvement comprising the step of contacting the wood with a formaldehyde scavenger and wood particles bonding enhancement agent selected from the group consisting of acetoacetamide, dimethylacetoacetamide, monomethylacetoacetamide, diethylacetoacetamide and monoethylacetoacetamide.

5,160,680

METHOD FOR THE PREPARATION OF DIRECTLY COMPRESSIBLE GRANULAR MANITOL

Michel Serpelloni, Bethune, and Patrick Lemay, Lestrem, both of France, assignors to Roquette Freres, Lestrem, France

Continuation of Ser. No. 262,195, Oct. 19, 1988, abandoned, which is a continuation of Ser. No. 783,528, Oct. 3, 1985, abandoned. This application Oct. 31, 1990, Ser. No. 605,157

Claims priority, application France, Oct. 3, 1984, 84 15212

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[5] B29C *47/00;* C07C *31/18*

U.S. Cl. 264—126 2 Claims

1. Method of preparing directly compressible granular mannitol with improved compressibility and friability properties, the said compressibility being up to about 88% of that of mannitol with binder and up to about twice that of commercial mannitol without binder, the said friability being intermediate between that of commercial mannitol without binder and that of mannitol with binder, comprising selecting a raw material consisting essentially of powdered mannitol containing less than 4% by weight of water, subjecting said raw material to an extrusion treatment inside an extruder comprising a heating zone provided with a heating system, at least one screw and at least one extrusion die, selecting a flow rate for the raw material supplied the extruder, a diameter for the extrusion die and a rotary speed for the screw so that the said raw material travels through the heating zone within about two minutes, heating the heating zone to a temperature of 230° to 300° C. such that the temperature of the raw material is from 165° to 168° C. inside the extrusion die and before leaving it, whereby a proportion 30 to 90% of the said raw material is melted.

5,160,681

METHOD FOR THE PREPARATION OF HETEROGENEOUS SILICONE RUBBER MOLDINGS

Koji Shimizu, Chiba, Japan, assignor to Dow Corning Toray Silicone Co., Ltd, Tokyo, Japan

Filed Oct. 24, 1991, Ser. No. 784,453

Claims priority, application Japan, Oct. 26, 1990, 2-287339

Int. Cl.[5] C08K *3/34*

U.S. Cl. 264—128 5 Claims

1. Method for the preparation of heterogeneous silicone rubber moldings wherein said method comprising filling a semicured silicone rubber particulate into the cavity of a mold, then introducing a thermosetting silicone rubber composition and closing the mold, and subsequently heating this mold with the application of pressure in order to form a single body or element by curing the aforesaid thermosetting silicone rubber composition at the same time that curing of the aforesaid semicured silicone rubber particulate is brought to completion.

5,160,682

METHOD OF MANUFACTURING A COMPOSITE BICYCLE FRAME

Craig D. Calfee, 691 Minna St., San Francisco, Calif. 94103

Division of Ser. No. 321,510, Mar. 9, 1989, Pat. No. 5,116,071. This application May 31, 1991, Ser. No. 708,986

Int. Cl.[5] B29C *37/00*

U.S. Cl. 264—161 1 Claim

1. A method for joining tubes of a bicycle frame to form a joint using multiple-piece static pressure molds, comprising the steps of:

placing continuous fiber composite material in cavities of a first piece of a multiple-piece static pressure mold such that said material extends beyond the boundaries of said cavities, the continuous fiber composite material being impregnated with a hardening agent;

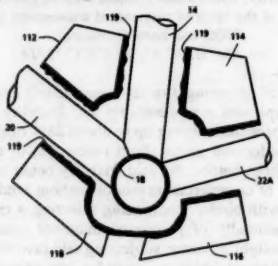
placing on top of said continuous fiber composite material the tubes to be joined;

wrapping said tubes in laminated contact with the continuous fiber composite material including said continuous

fiber composite material extending beyond the boundaries of said cavity such that said wrapped continuous fiber composite material extends beyond the boundaries of said cavities;

assembling said multiple-piece static pressure mold such that said continuous fiber composite material and said tubes are securely located therein;

clamping said static pressure mold;



hardening said hardening agent impregnated in said continuous fiber composite material;

removing the tubes having continuous fiber composite material wrapped and hardened therearound from said static pressure mold; and

trimming said wrapped and hardened continuous fiber composite material to form gussets at the intersection of said tubes.

5,160,683

Patent Not Issued For This Number

5,160,684

METHOD FOR EXTRUDING CERAMIC MULTI-LAYER STRUCTURAL BODIES

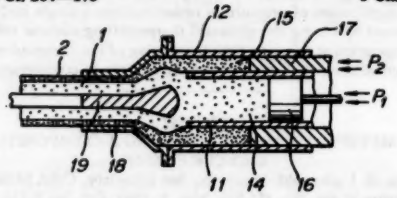
Hidenobu Misawa, Nagoya, Japan, assignor to NGK Insulators, Ltd., Japan

Continuation of Ser. No. 406,049, Sep. 12, 1989, abandoned. This application Jan. 11, 1991, Ser. No. 639,390

Claims priority, application Japan, Sep. 22, 1988, 63-236596

Int. Cl.[5] B32B *31/30*

U.S. Cl. 264—173 **3 Claims**



1. A method of shaping hollow ceramic multi-layer structural bodies by extruding ceramic molding compounds having respectively different properties through a die using an extrusion apparatus, the method comprising the steps of:

separately feeding and extruding the ceramic molding compounds under pressure through an inner cylinder and a space between the inner cylinder and an outer cylinder, respectively;

forming a hollow portion of the hollow structural bodies by passing the ceramic molding compounds around a core which is centrally arranged in the die such that an axially outer end of said core is substantially flush with an opening of the die; and

forming layers having variable thicknesses by adjusting only extruding pressures of each of the respective ceramic molding compounds thereby forming said ceramic multi-layer structural body inside said extrusion apparatus.

5,160,685

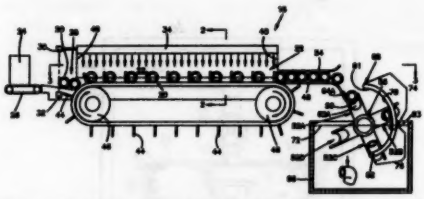
METHOD FOR BENDING PIPE

Thomas F. Moran, Jr., Chagrin Falls, Ohio, assignor to Midwest Plastic Fabricators, Chagrin Falls, Ohio

Division of Ser. No. 496,859, Mar. 21, 1990, Pat. No. 5,066,212. This application Nov. 18, 1991, Ser. No. 793,581

Int. Cl.[5] B29C *53/08*

U.S. Cl. 264—237 **4 Claims**



1. A method for bending a length of thermoplastic resin pipe into an elbow comprising the steps of:

heating the center portion of the length of pipe to a thermoplastic state;

disposing said heated portion of the pipe onto a bending surface of an arcuate die, said die being adapted for receiving and supporting said length of pipe substantially at a midline of said die;

bringing the end sections of said heated length of pipe into contact with at least two camming surfaces disposed on opposing sides of said die, said camming surfaces having a distal portion and a proximal portion relative to said die;

moving said die between a first position and a second position relative to said camming surfaces, said die gradually approaching said camming surfaces as said die moves along a line of travel from said first position to said second position, whereby portions of said length of pipe engage portions of said camming surfaces and are forced thereby toward the bending surfaces of said die until the length of pipe is formed into an elbow;

releasing said elbow from contact with said arcuate die and said camming surfaces; and

cooling said elbow.

5,160,686

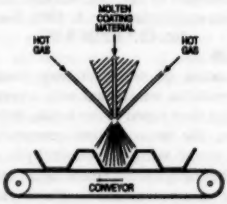
METHOD OF PRODUCING A NON-TACKY HOT MELT ADHESIVE CONTAINING PACKAGE

Martin D. Thaler, Somerville; Robert W. Giese, Wall; Paul Puletti, Pittstown, and Robert Schmidt, Great Meadows, all of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Jun. 4, 1990, Ser. No. 533,301

Int. Cl.[5] B29C *39/06*

U.S. Cl. 264—255 **12 Claims**



1. A method of producing a tackless hot melt adhesive package comprising melt blowing molten hydrogenated castor oil

through orifices of a heated die plate which is curtained by a stream of hot inert gas to form droplets which deposit a thin, adherent, continuous coating in a preformed support cavity,

the molten hydrogenated castor oil being heated to a temperature of about 190° to 300° F., the inert gas being at a temperature of from about 190° to 300° F. and a pressure of from about 10 to 50 psig,

the hydrogenated castor oil being at a sufficient flow rate to deposit a coating of about 0.05 to 1% by weight of hydrogenated castor oil based on the weight of the hot melt, and

casting a hot melt adhesive into the preformed support cavity, and

depositing a similar thin melt blown coating of hydrogenated castor oil on the uncoated adhesive top surface of the formed hot melt package.

5,160,687

SCREW CAP OF THERMOPLASTICS MATERIAL

Mario Margaria, San Damiano D'Asti, Italy, assignor to Alplast SpA, Asti, Italy

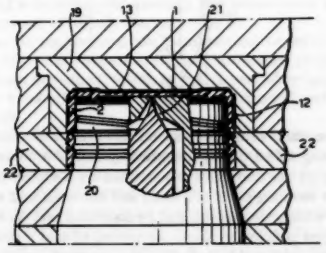
PCT No. PCT/EP89/00340, § 371 Date Oct. 1, 1990, § 102(e) Date Oct. 1, 1990, PCT Pub. No. WO89/09169, PCT Pub. Date Oct. 5, 1989

PCT Filed Mar. 28, 1989, Ser. No. 585,132

Claims priority, application Italy, Apr. 1, 1988, 67297 A/88

Int. Cl.[5] B29B *13/00*; B65D *41/00*

U.S. Cl. 264—271.1 **1 Claim**



1. A method for the manufacture of a screw cap of thermoplastic material having a horizontal end wall, including a downwardly-curved wall defining a peripheral edge of said horizontal end wall, a cylindrical skirt with internal threads and spaced apart external vertical grooves and a thin covering layer of a composite laminated material on an outer surface of the horizontal end wall to form a barrier against the passage of gases through the wall using a mold comprised of a matrix and a core which are capable of relative movement between an open and closed position, the method comprising:

positioning a disk which will form said thin covering layer in said matrix with the outer periphery of the disk fictionally engaged with projections on said matrix adapted to form the grooves in said skirt;

closing the mold to bring an end surface of the core into close proximity to said disk; and

injecting thermoplastic material through said core into a space between the core and the matrix so as to form the cap and simultaneously incorporate the disk in the horizontal end wall while simultaneously pressing the peripheral edge portion of the disk into an annular groove in the matrix whereby the outer peripheral edge of the disk will overlie the horizontal end wall of the cap and the downwardly-curved wall defining the peripheral edge of the horizontal end wall.

5,160,688

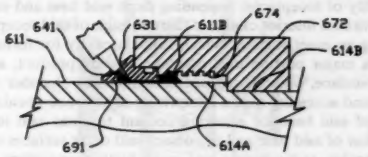
METHOD OF MAKING A COMPONENT PIPE COUPLING

Wayne B. Hockett, Tampa, Fla., assignor to Continuous Hose Corporation, Boynton Beach, Fla.

Continuation-in-part of Ser. No. 413,845, Sep. 27, 1989, Pat. No. 5,033,776. This application May 16, 1990, Ser. No. 523,992

Int. Cl.[5] B29C *45/14*

U.S. Cl. 264—275 **4 Claims**



1. A method of attaching a first coupling member to an end of a first hose, the first coupling member comprising an internal bore extending through the first coupling member and with first coupling linking threads defined in the internal bore, the method comprising the steps of:

forming a first attachment member including a first attachment internal bore for receiving the first hose therein;

forming a first input aperture in the first attachment member to communicate with the first attachment internal bore;

inserting the first hose into the first attachment internal bore;

placing at least a portion of the first attachment member and the first hose into a mold having mold threads defined in the mold;

inserting a flowable adhesive into the first input aperture for enabling the adhesive to flow through the first attachment internal bore into a void defined by the first attachment member and the first hose and the mold;

curing the adhesive within the void for bonding the first hose to the first attachment member and for creating first hose threads bonded to the first hose; and

threading the first hose threads of the first hose into the first coupling linking threads of the first coupling member for attaching the first hose to the first coupling member.

5,160,689

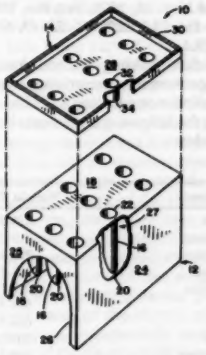
APPARATUS AND METHOD FOR MANUFACTURING COSMETIC PRODUCTS

Melvin E. Kamen, Highlands, N.J., assignor to Revlon Consumer Products Corporation, New York, N.Y.

Filed Nov. 16, 1990, Ser. No. 615,750

Int. Cl.[5] B29C *33/64*, *45/00*

U.S. Cl. 264—297.8 **17 Claims**



1. A multiple cavity mold for forming a plurality of cosmetic

lipstick products comprised of a thermoplastic material selected from the group consisting of a polyalkylene having 2 to 8 carbons, polyamide, styrenic, polyacetal, polycarbonate, polyacrylate, polyester, cellulosic, or mixtures thereof, wherein the inner surface of said mold has been halogenated with a plasma treatment gas selected from the group consisting of ethylene tetrafluoride, fluoroethane, silicon fluoride, fluorine, methyl fluoride, or mixtures thereof, wherein said cavities are sized and shaped so as to form lipstick bullets, comprising a base having a substantially hollow interior chamber and a plurality of receptacles depending from said base and extending into said interior chamber thereof, each of said receptacles having an inner surface, which forms a cavity for forming at least a major portion of a cosmetic lipstick product, and an outer surface, which is exposed to said interior chamber of said base; and accessing means comprising at least one opening in a wall of said base for allowing coolant to enter said interior chamber of said base and to contact said outer surfaces of said receptacles, and wherein said mold further comprises a cap section removably mounted on said base, said cap section having a plurality of projections extending outwardly therefrom, each of said projections defining a bore which is in alignment with a corresponding one of said cavities to form a portion of a corresponding cosmetic product.

12. A method of manufacturing a plurality of cosmetic products using a multiple cavity mold comprised of a thermoplastic material selected from the group consisting of a polyalkylene having 2 to 8 carbons, polyamide, styrenic, polyacetal, polycarbonate, polyacrylate, polyester, cellulosic, or mixtures thereof, wherein the inner surface of said mold has been halogenated with a plasma treatment gas selected from the group consisting of ethylene tetrafluoride, fluoroethane, silicon fluoride, fluorine, methyl fluoride, or mixtures thereof, said method comprising the steps of:

(i) providing a base with a substantially hollow interior chamber and a plurality of receptacles depending from said base and extending into said interior chamber, and a cap section with projections,

(ii) providing accessing means comprising an opening in a wall of said base,

(iii) placing the cap section on the base and filling each cavity of the mold with a quantity of cosmetic melt,

(iv) flowing a coolant through the accessing means into the interior chamber of the base to contact the outer surfaces of the receptacles to thereby solidify the cosmetic melts and form the products; and

(v) removing said products from the mold.

5,160,690

PROCESS FOR USING A HIGH PRESSURE INJECTION MOLDING CYLINDER

Walter G. Cox, Jr., Salem, and Schiao F. Chou, Blacksburg, both of Va., assignors to Xaloy Incorporated, Va.

Filed Nov. 15, 1991, Ser. No. 793,017
Int. Cl.[5] B29C *45/53, 45/62*
U.S. Cl. 264—328.1 **5 Claims**

1. In an injection molding method for preparing plastic articles, the improvement comprising injection molding a plastic using a cylinder comprising a steel backing and an alloy inlay comprising the following ingredients in about the proportions set forth below:

Ingredient	Weight Percent
Carbon	1.0–2.0
Chromium	3.0–7.5
Molybdenum	2.0–8.0
Tungsten	2.0–8.0
Vanadium	2.5–6.5
Nickel	0.0–5.0
Cobalt	0.0–7.0
Silicon	0.0–0.6
Manganese	0.0–1.0
Copper	0.0–5.0

-continued

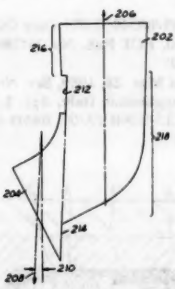
Ingredient	Weight Percent
Iron	balance

5,160,691

INTAKE MANIFOLD/FUEL RAIL METHOD

Paul D. Daly, Troy, Mich., assignor to Siemens Automotive L.P., Auburn Hills, Mich.

Division of Ser. No. 563,459, Aug. 7, 1990, Pat. No. 5,062,405.
This application Aug. 26, 1991, Ser. No. 749,738
Int. Cl.[5] B29C *45/40*
U.S. Cl. 264—334 **8 Claims**



1. A method of making an internal combustion engine part comprising a fuel rail by introducing moldable material into a molding cavity cooperatively defined by a closed position of multiple working parts of a mold and allowing said material to solidify within said cavity, and by disposing said working parts to an open position to allow separation of said molded engine part from said mold, including the steps of creating sockets adapted to receive electromagnetic-operated fuel injectors, of creating a fuel passageway structure adapted for placing said sockets in fluid communication with an external fuel supply for ingress and egress of liquid fuel to and from said sockets, and of creating at least one through-passage comprising an inlet adapted to be communicated to a combustion air supply and an outlet adapted to be communicated to a combustion chamber space of an internal combustion engine for conveyance of combustion air through said molded engine part, characterized in that said step of creating said at least one through-passage for conveyance of combustion air through said molded engine part comprises disposing two complementary and separably engaged core parts within said cavity so as to cooperatively define and occupy said through-passage during said step of introducing said moldable material into said cavity and allowing said material to solidify within said cavity, and then, after said material has solidified, separating said two core parts by relative movement away from each other in generally opposite but non-colinear directions, characterized further in that said core parts are disposed within said cavity during said step of introducing said moldable material into said cavity and allowing said material to solidify such that a portion of one of said two core parts occupies an entire length of said through-passage as measured along one particular circumferential zone of said through-passage.

5,160,692

PROCESS AND PLANT FOR PRODUCING A LINING ON THE INNER WALLS OF A METALLURGICAL VESSEL

Jean-Charles Daussan, Metz; Gérard Daussan, and André Daussan, both of Longeville-les-Metz, all of France, assignors to Daussan et Compagnie, Woippy, France

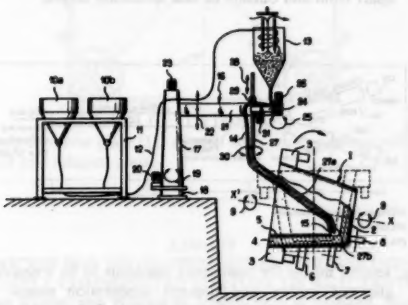
PCT No. PCT/FR90/00297, § 371 Date Dec. 21, 1990, § 102(e) Date Dec. 21, 1990, PCT Pub. No. WO90/12666, PCT Pub. Date Nov. 1, 1990

PCT Filed Apr. 25, 1990, Ser. No. 623,907

Claims priority, application France, Apr. 26, 1989, 89 05528

Int. Cl.[5] B22D *41/02*

U.S. Cl. 266—44 18 Claims



1. Process for producing a lining (5, 55) on the inner walls of a metallurgical vessel (1, 50) adapted to receive liquid metal, comprising the following steps:

a) placing a metallurgical vessel (1, 50) whose inner walls to be lined are relatively hot on a support;

b) tilting the support and the metallurgical vessel (1, 50) to bring the vessel successively into a number of different positions, in each of which at least a part of an inner wall of the vessel (1, 50) is substantially horizontal and turned upwards;

c) in each of the abovementioned positions depositing at least one substantially uniform layer of a substantially dry material comprising a mixture of refractory particles and a binder capable of setting when heated, on the said substantially horizontal inner wall, the composition and the particle size range of the mixture of refractory particles being such that this mixture sinters in contact with the liquid metal;

d) the inner walls of the vessel being initially at a sufficient temperature to be able to heat the material deposited on them to a temperature permitting the softening and the setting of the binder of said material and the formation of a monolithic lining (5, 55) which adheres to the inner walls of the vessel (1, 50).

5,160,693

IMPELLER FOR TREATING MOLTEN METALS

Charles E. Eckert, 260 Lynn Ann Dr., New Kensington, Pa. 15068, and Nicholas G. Walker, 692 Mimosa Tree La., West Chester, Pa. 19380

Filed Sep. 26, 1991, Ser. No. 766,624

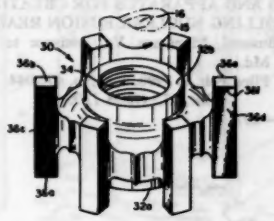
Int. Cl.[5] C22B *21/06*

U.S. Cl. 266—235 32 Claims

1. An impeller head adapted to be mounted on a rotary impeller shaft mounted in a vessel, the shaft having gas flow outlet opening for discharging a gas for treating liquid in said vessel, comprising:

a hub having an central, axial bore for mounting said impeller head on said shaft adjacent said outlet opening, a first end surface adjacent said outlet opening, and a second end surface remote from said outlet opening, said surfaces defining therebetween a hub thickness;

a predetermined number of vanes fixed to and extending radially beyond said hub, said vanes being generally equally spaced about the outer perimeter of said hub, each vane having an axial length and a circumferential dimension, first and second end surfaces defining therebetween the axial length of the vanes, and a leading surface and trailing surface defining therebetween the circumferential



dimension of the vanes, said end surfaces and said leading and trailing surfaces defining edges at their junctions;

an axial groove in one of said end surfaces, said groove intercepting said leading surface edge and said trailing surface edge to increase turbulence in said liquid upon rotation of said impeller head.

5,160,694

FUSION REACTOR

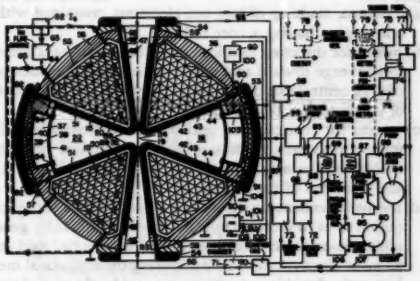
Werner Steudtner, Lindenhof 5, CH-8604 Hegnau bei Zürich, Switzerland

Filed Dec. 26, 1990, Ser. No. 633,961

Claims priority, application Switzerland, Jan. 22, 1990, 00213/90

Int. Cl.[5] G21B *1/02*

U.S. Cl. 376—107 20 Claims



1. Fusion reactor comprising a reaction zone, a magnetic field with magnetic flux lines surrounding the reaction zone, the magnetic flux lines being curved convexly seen from the reaction zone in the nearer surrounding of the reaction zone,

an electric potential pot formed by an electric field surrounding the reaction zone for conversion of kinetic energy of ionized reactants escaping from the reaction zone into potential energy thereof and for subsequent return of the ionized reactants into the reaction zone with reconversion of their potential energy into kinetic energy,

an ion source in an upper area of the electric potential pot distributed over a ringlike-shaped area surrounding the reaction zone, wherein the reaction zone is positioned in a center region of the electric potential pot surrounding the reaction zone, the portions of the magnetic flux lines extending within the electric potential pot in the region between the upper area of the electric potential pot and the reaction zone run substantially perpendicularly to equipotential lines of the electric field forming the electric potential pot, and

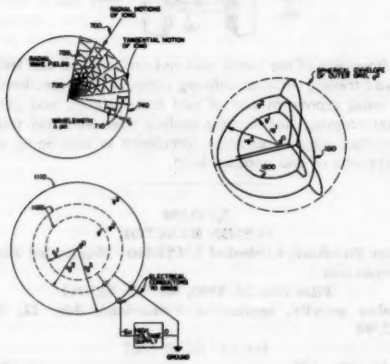
the electric potential pot comprises at least an electrode in its upper area and at least an electrode in its bottom area in the nearer surrounding of the reaction zone being heated to a temperature within an upper part of the temperature range of liquidity of lithium.

5,160,695

METHOD AND APPARATUS FOR CREATING AND CONTROLLING NUCLEAR FUSION REACTIONS

Robert W. Bussard, Manassas, Va., assignor to QED, Inc., Greenbelt, Md.

Filed Feb. 8, 1990, Ser. No. 476,044
Int. Cl.[5] G21B *1/00*
U.S. Cl. 376—107 **51 Claims**



1. Apparatus of enhancing nuclear fusion reactions comprising:

a) a plasma, made up of ions and electrons, contained with a core region having a core radius;

b) means for directing said ions and electrons of said plasma to converge toward said core region which includes one of (1) a central axis of a cylindrical system and (2) a center of a generally spherical system;

c) means for recirculation said plasma in generally radial motion outwards from said core region and returning thereto by the action of the directing means on the ions and electrons of the plasma, and;

d) means for enhancing the density of said plasma in the core region so as to increase nuclear fusion reactions by generating ion-acoustic electrostatic waves therein, said ion-acoustic electrostatic waves reducing the collisional mean free path of said ions to dimensions set by the wavelength of the said ion-acoustic electrostatic waves creater therein, thus enhancing density by collision-diffusion trapping of said ions to thereby enhance nuclear fusion reactions.

5,160,696

APPARATUS FOR NUCLEAR TRANSMUTATION AND POWER PRODUCTION USING AN INTENSE ACCELERATOR-GENERATED THERMAL NEUTRON FLUX

Charles D. Bowman, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 17, 1990, Ser. No. 560,900
Int. Cl.[5] G21G *1/02*
U.S. Cl. 376—189 **60 Claims**

1. An apparatus for producing power from fertile nuclear materials and transmuting wastes therefrom to less radioactive species, said apparatus comprising in combination:

a. means for generating a high intensity, high-energy beam of protons;

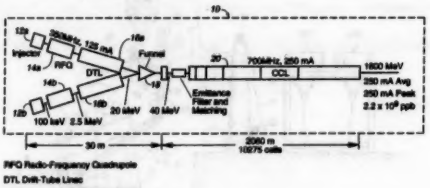
b. a liquid-metal spallation target having an upwardly facing open surface for producing a high neutron flux upon being impacted by high-energy protons;

c. a substantially gas-tight enclosure surrounding said spallation target;

d. windowless means for directing the beam of protons onto the open surface of said spallation target;

e. neutron moderation means for thermalizing neutrons generated from said spallation target;

f. first means for containing the fertile nuclear material disposed within said neutron moderation means and spaced apart from and outside of said spallation target;



g. second means for containing materials to be transmuted disposed within said neutron moderation means and spaced apart and outside of said spallation target, yet closer thereto than said first containment means;

h. first flowing means for passing the fertile nuclear material and transmutation products thereof through said first containment means;

i. means for combining the fertile nuclear material with a molten salt eutectic and causing the combination formed thereby to flow through said first flowing means; and

j. means for extracting fission products from the molten salt eutectic flowing through said first flowing means, separating the stable and short-lived fission products therefrom, and introducing the remaining material into said second containment means for transmutation.

5,160,697

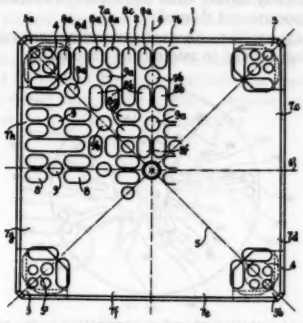
LOWER CONNECTOR FOR A FUEL ASSEMBLY OF A NUCLEAR REACTOR, COMPRISING AN ADAPTOR PLATE AND A FILTRATION PLATE

Michel Verdier, Villeurbanne, and Regis Mortgat, Couzon-Au-Mont D'Or, both of France, assignors to Framatome and Cogema, France

Filed Jul. 11, 1991, Ser. No. 728,579
Claims priority, application France, Jul. 11, 1990, 90 08835
Int. Cl.[5] G21C *1/04*
U.S. Cl. 376—352 **9 Claims**

1. Lower connector for a fuel assembly of a nuclear reactor, said lower connector comprising an adapter plate (2) of square shape traversed by water passage orifices (8, 9), and a filtration plate (11) pierced with holes of small dimensions and located in abutment with said adaptor plate (2), said water passage orifices of said adaptor plate being arranged completely symmetrically to one another in relation to medians (6, 6') and diagonals (5, 5') of said adaptor plate (2), each sector (*7a*, *7b*, *7c*, *7d*, *7e*, *7f*, *7g*, *7h*) of said adaptor plate (2) delimited by a median (6, 6') and a diagonal (5, 5') comprising orifices (8) having an

oblong shape in cross-section, and said holes in said filtration plate (11) comprising sets of said holes (15) arranged in zones



of said filtration plate (11) aligned with water-passage orifices (8) of said adaptor plate.

5,160,698

PROCESS FOR PRODUCING METAL BORIDES USING FINELY COMMINUTED MIXTURE OF REACTANTS

Bijan Khazai, and William G. Moore, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 2, 1991, Ser. No. 724,618
Int. Cl.[5] B22F *9/18*; C22C *32/00*
U.S. Cl. 419—12 8 Claims

1. A process for producing a finely divided metal boride comprising the steps of:

(A) preparing a mixture of reactants having an average agglomerated particle size of up to about 200 microns composed of individual particles having a particle size of less than 20 microns, comprising a carbon source reactant, a boron source reactant, and a metal compound reactant, which can be converted to the corresponding metal boride by reaction at elevated temperature,

(B) reacting said particles in a heating zone under an inert atmosphere at a suitable temperature and for a suitable time to convert the metal compound to the corresponding metal boride wherein the average particle size of said metal boride is about 0.05 to about 0.5 micron.

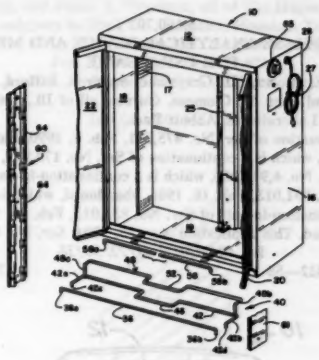
5,160,699

GERMICIDAL APPARATUS

Burton L. Siegal, Skokie, Ill., assignor to Sellstrom Manufacturing Company, Palatine, Ill.

Filed Feb. 1, 1991, Ser. No. 649,856
Int. Cl.[5] A61L *2/00*
U.S. Cl. 422—24 10 Claims

1. Apparatus for exposing protective eyewear to ultraviolet radiation comprising a cabinet including two first walls having preselected vertical and lateral dimensions, two second walls joined to and extending between said two first walls, the said second walls having a vertical dimension equivalent to that of said two first walls and a lateral dimension substantially less than the lateral dimension of said two first walls, means defining an access opening into said cabinet in one of said two first walls, reflector means on each interior surface of said second walls having a textured surface that reflects ultraviolet radiation at a plurality of angles to provide a substantially uniform level of radiation exposure to eyewear throughout the cabinet, a single lamp having a length substantially equal to the vertical dimension of the said two first walls disposed on one of said first walls substantially at the center thereof which lamp emits ultraviolet radiation at a germicidal frequency, and support



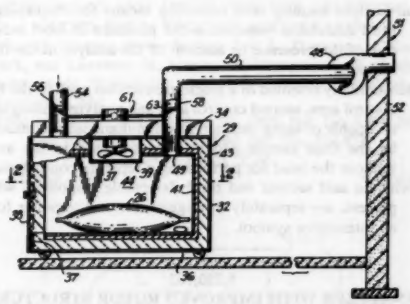
means within said cabinet configured so as to cradle and support protective eyewear.

5,160,700

STERILIZING SYSTEM AND METHOD

Harold W. Anderson, Oyster Bay, N.Y., and Charles H. Harrison, Haw River, N.C., assignors to H. W. Andersen Products, Inc., Oyster Bay, N.Y.

Continuation-in-part of Ser. No. 416,896, Oct. 4, 1989, Pat. No. 5,082,636. This application Jan. 2, 1991, Ser. No. 636,838
The portion of the term of this patent subsequent to Jun. 26, 2007, has been disclaimed.
Int. Cl.[5] A61L *2/00*
U.S. Cl. 422—34 22 Claims



9. A method of sterilizing articles in an enclosed work area comprising the steps of containing a volatile sterilant within a sealed container, disposing said sealed container along with the articles to be sterilized and a moisture-releasing humidifying device having a vapor-permeable cover within a first enclosure made at least partially of a gas-permeable membrane, sealing said first enclosure, disposing said sealed first enclosure within a second enclosure, effecting a sterilizing cycle by releasing said sterilant from said sealed container into said first enclosure in gaseous form, passing said sterilant gas into said second enclosure by diffusion through said gas-permeable membrane while maintaining sterilizing conditions in said first enclosure during a sterilizing cycle to thereby effect sterilization of said articles in said first enclosure, releasing moisture from said moisture-releasing humidifying device into said sealed first enclosure during said sterilizing cycle, and regulating the gaseous conditions within said second enclosure to minimize

the amount of sterilant gas in said second enclosure, thereby providing for minimized residue sterilant in said enclosed work area in which said second enclosure is disposed.

5,160,701

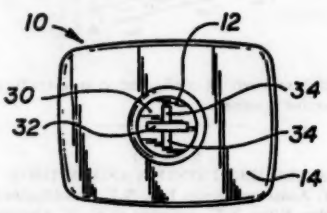
SOLID-PHASE ANALYTICAL DEVICE AND METHOD FOR USING SAME

William E. Brown, III, Grayslake; Sarah E. Safford, Libertyville, and John M. Clemens, Gurnee, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Continuation of Ser. No. 475,591, Feb. 6, 1990, Pat. No. 5,008,080, which is a continuation of Ser. No. 173,979, Mar. 28, 1988, Pat. No. 4,916,056, which is a continuation-in-part of Ser. No. 831,013, Feb. 18, 1986, abandoned, which is a continuation-in-part of Ser. No. 831,013, Feb. 18, 1986, abandoned. This application Apr. 15, 1991, Ser. No. 685,345

Int. Cl.[5] G01N *31/22, 33/58*

U.S. Cl. 422—56 29 Claims



1. A solid-phase assay device for use in a binding assay to determine the presence or amount of a specific binding analyte in a fluid sample, comprising a reaction site having:

a first control area including means for displaying a first detectable response if the assay results are invalid,

a second control area including means for displaying a second detectable response indicative of a valid assay result, and

an analyte binding area including means for displaying a third detectable response in the presence of label indicative of the presence or amount of the analyte in the fluid sample,

substantially oriented in a single area so that each of the first control area, second control area and analyte binding area is capable of being substantially simultaneously contacted by the fluid sample and by reagents used in the assay without the need for performing a separate control assay,

wherein said second and third detectable responses, when present, are separately distinguishable and together form an interactive symbol.

5,160,702

ANALYZER WITH IMPROVED ROTOR STRUCTURE

Anne R. Kopf-Sill, Portola Valley, and Robert Zuk, Burlingame, both of Calif., assignors to Molecular Devices Corporation, Menlo Park, Calif.

Filed Jan. 17, 1989, Ser. No. 297,563

Int. Cl.[5] G01N *9/30;* B04B *11/00*

U.S. Cl. 422—72 26 Claims

1. In an apparatus for analyzing fluids having components of different density, an improved analyzer rotor comprising:

a rotatable element mounted for rotation having interconnected chambers and channels disposed in the surface thereof,

said channels and chambers comprising

a mixing chamber,

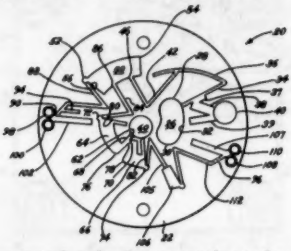
a diluent capillary channel having one end connecting to said mixing chamber,

a blood chamber,

a curved separating channel in communication with said blood chamber for separating red cells from the plasma of whole blood,

said curved separating channel having one end spaced radially farther from the center of rotation than the opposite end thereof,

a plasma capillary channel connecting said curved separating channel to said mixing chamber,



a diluent metering chamber connecting to the other end of said diluent capillary channel, and

means for rotating said rotatable element at varying speeds to effect movement of fluids through said channels and to mix said separated plasma with diluent.

5,160,703

Patent Not Issued For This Number

5,160,704

METHOD AND APPARATUS FOR COLLECTING AND SEPARATING PARTICLES FROM FLUID FOR MEDICAL DIAGNOSIS

Gert Schlüter, Gundelfingen, Fed. Rep. of Germany, assignor to Remedia AG, Basel, Switzerland

Continuation of Ser. No. 458,153, Dec. 28, 1989, abandoned. This application Jan. 29, 1992, Ser. No. 827,573

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1989, 3904872

Int. Cl.[5] B01L *11/00*

U.S. Cl. 422—101 9 Claims

1. A medical diagnostic apparatus for collecting and separating particles from a liquid comprising:

a first container having a first aperture disposed in one end of said first container serving as a bottom thereof for vertical immersion into a liquid to a given depth;

at least one liquid-permeable capillary suction element within said first container for drawing said liquid into said element by capillary action when in contact with said liquid; and

a particle collection layer separate from said capillary suction element and permeable to fluids but not to particles and disposed to cover said first aperture so that when said first aperture is dipped into said liquid

said capillary suction element draws said liquid upwardly through said layer and into contact with lower portions of

said capillary suction element to deposit said particles on an outside bottom surface of said layer, said first container having a portion thereof above said first aperture configured as an elongated shape to be graspable by a user and to be moved about so that the bottom thereof can be immersed in a liquid body and then wiped against a slide, at least portions of said article collection layer extending beyond the bottom of said first container so that said layer can be wiped onto a slide to allow particles collected on said layer to be removed and examined.

5,160,705

APPARATUS FOR FLUIDIZING GRANULAR MATERIAL

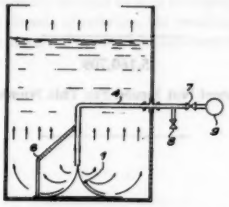
Vincent Savall, Velizy Villacoublay, and Francois-Xavier Ball, Chatou, both of France, assignors to Degremont, Rueil-Malmaison, France

Filed Jun. 26, 1990, Ser. No. 543,489

Claims priority, application France, Jun. 30, 1989, 89 08818

Int. Cl.[5] F27B *15/08*; B01J *8/18*

U.S. Cl. 422—140 **4 Claims**



1. Apparatus for fluidizing granular material contained in a vessel, said apparatus comprising:

a vessel including a bottom wall, a liquid injection tube means mounted within said vessel for introducing fluidizing liquid into said vessel, said injection tube means having a central axis; and,

liquid flow directing means for directing the flow of fluidizing liquid as said liquid is introduced into said vessel, said liquid flow directing means comprising:

a) a lower base portion for supporting said flow directing means on the bottom wall of said vessel;

b) an upwardly-extending flow-directing portion integral with said base portion and comprising a surface of revolution having an outwardly concave surface extending upwardly from said base portion to a vertically elongated top portion, said top portion extending into said injection tube means along the axis of said tube means, thereby creating an annular space between said injection tube means and said top portion through which fluidizing liquid can flow and equalize energy released into said vessel by the introduction therein of said fluidizing liquid, said injection tube means being secured to feeding pipe means for introducing fluidizing liquid into said injection tube means, and said feeding pipe means being attached to at least one support arm secured to said base portion.

5,160,706

PROCESS FOR THE CATALYTIC CRACKING OF A HYDROCARBON OIL

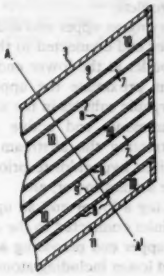
Frank H. H. Khouw; Marinus J. Spiessens; Martin J. P. C. Nieskens, and Jouke J. Woudstra, all of The Hague, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 604,856, Oct. 26, 1990. This application Jun. 5, 1991, Ser. No. 710,471

Claims priority, application United Kingdom, Oct. 17, 1989, 8923345.6

Int. Cl.[5] B01J *8/22*

U.S. Cl. 422—140 **4 Claims**



1. A device for introducing a hydrocarbon into a riser reactor comprising a tubular diluent gas conduit having an interior wall surface and an exterior wall surface wherein said interior wall surface is for passing a diluent gas into a riser reactor and two or more tubular hydrocarbon supply conduits, longitudinally perforated, arranged within the tubular diluent gas conduit wherein said longitudinal perforations are adapted to pass the diluent gas from the tubular diluent gas conduit into the tubular hydrocarbon supply conduit.

5,160,707

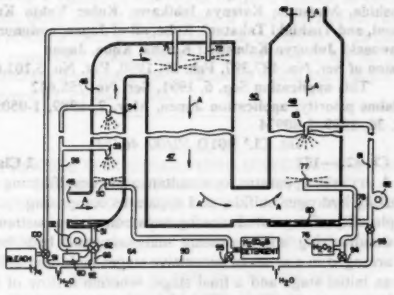
METHODS OF AND APPARATUS FOR REMOVING ODORS FROM PROCESS AIRSTREAMS

Charles M. Murray, Silver Spring; Joel L. Thompson, College Park, and Lawrence H. Hentz, Jr., Hampstead, all of Md., assignors to Washington Suburban Sanitary Commission, Hyattsville, Md.

Division of Ser. No. 398,389, Aug. 26, 1989, Pat. No. 4,994,245. This application Dec. 7, 1990, Ser. No. 623,873

Int. Cl.[5] B01D *50/00*

U.S. Cl. 422—170 **4 Claims**



1. Apparatus for scrubbing a steam of process air from a sewage composting facility, wherein the process air has been used to aerate compost for passage therethrough, the process air including ammonia, sulfides, and malodorous organic compounds, the apparatus comprising:

a first tower having an upper end and a lower end with an

inlet at the lower end and an outlet at the upper end, the first tower including an atomizing station for treating the process air with an atomized dilute sulfuric acid mixture as the air rises in the first tower from the lower to the upper end, the mixture having atomized droplets of a selected size, the first tower further including a sump at the lower end thereof for removing the dilute sulfuric acid mixture from the rising airstream and a recirculating means for recirculating the mixture and spraying the mixture at a recirculating station into the airstream upstream of the atomizing station and beneath the upper end of the first tower, the mixture being sprayed at the recirculation station having droplets of a size substantially larger than the atomized droplets;

a second tower having an upper end and lower end with an inlet at the upper end connected to the outlet of the first tower and an outlet at the lower end, the second tower including means proximate the upper end thereof for oxidizing the organic sulfides in the airstream subsequent of removing ammonia and active organic compound therefrom by treating the airstream with an atomized solution of sodium hypochlorite prior to descent of the airstream in the second tower; and

a third tower having a lower end an upper end, the lower end having an inlet connected to the outlet of the second tower and the upper end providing an outlet for the airstream, the third lower including atomizing means at a site proximate the lower end thereof for treating the airstream with an atomized hydrogen peroxide solution with atomized droplets of a selected size as the airstream rises in the third tower to maintain the oxidation reaction wile removing chlorine from the airstream, the third tower further including means of precipitating products of the oxidation reaction from the airstream by recirculating the hydrogen peroxide solution and spraying the hydrogen periodic solution into the airstream in a droplet size substantially larger than the atomized droplet size at a location downstream of the site of the atomizing means for treating the airstream with hydrogen peroxide.

5,160,708

DRY TYPE SIMULTANEOUS DESULFURIZATION AND DEDUSTING APPARATUS AND METHOD OF OPERATION THEREFOR

Kenzaburo Kodama, Kakogawa; Kenji Kamei, Kobe; Kousuke Yoshida, Matsudo; Katsuya Ishikawa, Kobe; Yukio Kubo, Itami, and Yoshiaki Takatani, Kobe, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Division of Ser. No. 487,397, Feb. 28, 1990, Pat. No. 5,102,636. This application Sep. 6, 1991, Ser. No. 755,642

Claims priority, application Japan, Mar. 2, 1989, 1-050581; Mar. 30, 1989, 1-80974

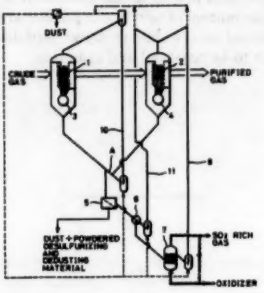
Int. Cl.[5] B01D *50/00, 46/32*

U.S. Cl. 422—171 **2 Claims**

1. A dry type apparatus for simultaneously desulfurizing and dedusting hydrogen sulfide, said apparatus comprising:

a plurality of separated moving beds containing particulate desulfurizing and dedusting materials, said beds being arranged in a series of successive stages including at least an initial stage and a final stage, wherein a flow of said hydrogen sulfide is successively passed through said materials of said initial stage and said final stage of said series, respectively, for desulfurizing and dedusting; and

material movement control means at the bottom of each of said stages for independently controlling the movement rate of said materials of said beds, the movement rate of said material at said initial stage being greater than the movement rate of said material at said final stage whereby



said initial stage is used mainly for dedusting and said final stage is used mainly for desulfurizing.

5,160,709

Patent Not Issued For This Number

5,160,710

APPARATUS FOR CONTINUOUS PRODUCTION OF INTUMESCED PARTICLES

Raymond T. Ertle, and Raymond J. Ertle, both of 15 Elizabeth Ave., Pompton Plains, N.J. 07444

Filed Nov. 8, 1991, Ser. No. 790,671

Int. Cl.[5] B01D *1/00;* **C01B** *15/12;* **C07C** *221/00;* **B03B** *1/00*

U.S. Cl. 422—307 **14 Claims**

1. Apparatus for continuous production of puffed, expanded, intumesced or exfoliated particles, comprising in combination:

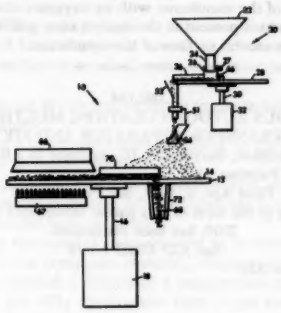
(a) a rotatable processing table;

(b) a speed controllable motor connected to rotate said table at a desired rotational rate;

(c) particulate feeding means overlying said table for depositing the particles to be intumesced onto a first sector in the rotational path of the upper surface of said processing table during rotation thereof;

(d) heating means provided at a second sector in said rotational path which is spaced from the said first sector, for heat expanding said particles during passage through said second sector;

(e) particle sweeping means mounted above said processing table at a third sector in the rotational path of said table surface which is spaced and downstream from the second sector, said sweeping means being adapted to intercept the expanded particles advancing on said table surface from said second zone and move said particles to the periphery of said table and thence off the table; and



(f) a collector means positioned to one side of said processing table and beneath the end of said sweeping means remote from the table axis of rotation, for receiving the expanded particles as same are moved by said sweeping means from said table.

5,160,711

CYANIDE LEACHING METHOD FOR RECOVERING PLATINUM GROUP METALS FROM A CATALYTIC CONVERTER CATALYST

Gary B. Atkinson, Reno; Robert J. Kuczynski, Sparks, and Dennis P. Desmond, Reno, all of Nev., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed May 10, 1991, Ser. No. 698,031

Int. Cl.[5] C01G *55/00*; C22B *11/00*

U.S. Cl. 423—22 **15 Claims**

1. A method for recovering platinum group metal from a catalyst, comprising

(a) leaching a catalytic converter catalyst containing at least one platinum group metal selected from the group consisting of platinum, rhodium and palladium with a cyanide solution at a temperature greater than about 100° C. to form soluble platinum group metal-cyanide complexes in solution;

(b) removing solids from the resulting pregnant leach solution; and

(c) heating the pregnant leach solution from which the solids have been removed to a temperature sufficient to decompose the platinum group metal-cyanide complexes and precipitate the platinum group metal.

5,160,712

LITHIUM TRANSITION METAL OXIDE

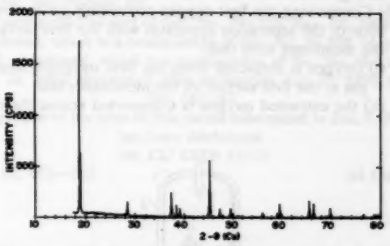
Michael M. Thackeray, and Rosalind J. Gummow, both of Pretoria, South Africa, assignors to Technology Finance Corporation (Prop.) Ltd, South Africa

Filed Mar. 27, 1991, Ser. No. 675,693

Claims priority, application South Africa, Apr. 12, 1990, 90/2838; May 23, 1990, 90/3996

Int. Cl.[5] C01G *1/00*, *49/00*; C22B *1/00*

U.S. Cl. 423—138 **22 Claims**



1. An essentially layered lithium transition metal oxide compound comprising lithium cations, transition metal cations T and oxygen anions, the T cations being selected from Co cations and mixtures of Co cations and Ni cations in which mixtures the Ni cations make up a minor proportion of at most 25% of the T cations and the compound being in accordance with the formula:

$$Li_xTO_y$$

wherein x is greater than or equal to 0.4 and less than or equal to 1.4, and y is greater than or equal to 1.7 and less than or equal to 2.7, the transition metal cations having an average valency of form +3 to +4, the compound having its O anions arranged in layers in a substantially cubic-close packed arrangement, with its Li cations being arranged in layers and its T cations occupying octahedral sites and being arranged in layers, each layer of the Li cations being sandwiched between two layers of the O anions and each said layer of O anions being sandwiched between a said layer of Li cations and a layer of T cations, 75%–99.8% of the T cations in the compound being located in the layers of T cations, and the remainder of the T cations being located in the layers of Li cations, the compound being characterized in that it has an X-ray diffraction trace using CuK_α radiation which has a single peak between 65°2Θ and 67°2Θ.

5,160,713

PROCESS FOR SEPARATING OXYGEN FROM AN OXYGEN-CONTAINING GAS BY USING A BI-CONTAINING MIXED METAL OXIDE MEMBRANE

Terry J. Mazanec, Solon, and Louis J. Velenyi, Lyndhurst, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Oct. 9, 1990, Ser. No. 594,247

Int. Cl.[5] C01B *13/00*

U.S. Cl. 423—210 **40 Claims**

1. A process for separating oxygen from a first oxygen-containing gas, the process comprising:

(A) Feeding the first oxygen-containing gas into a first zone of a gas separation apparatus, the apparatus comprising

first and second zones separated by a mix metal oxide membrane, the membrane having a first surface open to the first zone, a second surface open to the second zone, and an empirical formula of

$$Bi\ A_xM_yM'_zO_n$$

where

A is at least one of La, U, Th, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y, Mg, Ca, Sr and Ba;

M is at least one of Sc, Ti, Cr, Mn, Fe, Ni, Cu and Zn;

M′ is at least one of Co, Rh, Pd, Pt and Ru;

x and y are individually a number between about 0.01 and about 10;

z is a number of 0 to about 0.2; and

n is a number that satisfies the valence requirements of the other elements present;

the first zone having an equilibrium oxygen partial pressure greater than that of the second zone;

(B) Contactiong the first oxygen-containing gas in the first zone of the separation apparatus with the first surface of the membrane such that:

(i) oxygen is extracted from the first oxygen-containing gas at the first surface of the membrane; and

(ii) the extracted oxygen is transported across the membrane, in the form of oxide ions, to the second surface of the membrane; and

(C) Reacting the extracted oxygen present on the second surface of the membrane with an oxygen-consuming substance that is present in the second zone and is in contact with the second surface of the membrane.

39. A process for separating oxygen from a first oxygen-containing gas, the process comprising:

(A) Feeding the first oxygen-containing gas into a first zone of a gas separation apparatus, the apparatus comprising first and second zones separated by a mixed metal oxide membrane, the membrane having a first surface open to the first zone, a second surface open to the second zone, and an empirical formula of

$$BiA_xM_yM'_zO_n$$

where

A is at least one of La, U, Th, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y, Mg, Ca, Sr, and Ba;

M is at least one of Sc, Ti, Cr, Mn, Fe, Ni, Cu and Zn;

M′ is at least one of Co, Rh, Pd, Pt and Ru;

x and y are individually a number between about 0.01 and about 10;

z is a number of greater than 0 to about 0.2; and

n is a number that satisfies the valence requirements of the other elements present;

the first zone having an equilibrium oxygen partial pressure greater than that of the second zone;

(B) Contacting the first oxygen-containing gas in the first zone of the separation apparatus with the first surface of the membrane such that:

(i) oxygen is extracted from the first oxygen-containing gas at the first surface of the membrane; and

(ii) the extracted oxygen is transported across the membrane, in the form of oxide ions, to the second surface of the membrane; and

(C) Reacting the extracted oxygen present on the second surface of the membrane with an oxygen-consuming substance that is present in the second zone and is in contact with the second surface of the membrane.

5,160,714

CONTINUOUS AUTOCIRCULATION, MULTIPLE ZONE MASS TRANSFER APPARATUS AND METHOD

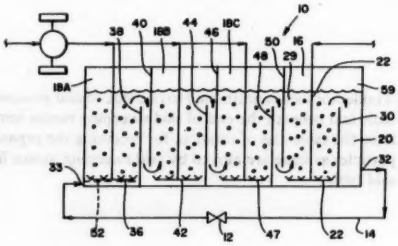
Leslie C. Hardison, Barrington, Ill., assignor to ARI Technologies, Inc., Palatine, Ill.

Filed Apr. 8, 1991, Ser. No. 682,598

The portion of the term of this patent subsequent to Jun. 30, 2009, has been disclaimed.

Int. Cl.[5] C01B *17/16*

U.S. Cl. 423—220 **21 Claims**



1. In a continuous process for intimate contact of a liquid reagent sequentially with a process gas and a second gas in a vessel including a first mass transfer zone including one or more mass transfer stages, and a second mass transfer zone laterally spaced and in liquid communication, such that liquid reagent is introduced into the first mass transfer zone and flows through the first mass transfer zone in intimate contact with the process gas, and the liquid reagent flows from the first mass transfer zone, through the second mass transfer zone for intimate contact with the second gas in said second mass transfer zone, said liquid reagent flowing through the second mass transfer zone in intimate contact with the second gas and flowing out of the second mass transfer zone through a liquid reagent outlet and including means for separating gases present in one mass transfer zone from gases present in the other mass transfer zone, the improvement comprising:

said second mass transfer zone including one or more mass transfer stages in liquid flow communication, with an upper end of a last mass transfer stage of said second mass transfer zone in fluid communication with a first stage of said first mass transfer zone, through an intermediate flow channel wherein no additional gas is dispersed in the liquid within the intermediate flow channel, and containing a level of liquid reagent in boh mass transfer zones,

establishing the flow of said liquids and gases in said two mass transfer zones to flow cocurrently in each of said mass transfer zones; and

continuously flowing liquid reagent from said second mass transfer zone into said first mass transfer zone for continuous recirculation of liquid and sequential intimate contact of said liquid reagent with said two gases.

5,160,715

CLAY COMPOSITES FOR REMOVAL OF SO_x FROM FLUE GAS STREAMS

Thomas J. Pinnavaia, East Lansing; Christine A. Polansky, Ithaca, and Jayantha Amarasekera, East Lansing, all of Mich., assignors to Board of Trustees operating Michigan State University, East Lansing, Mich.

Division of Ser. No. 719,987, Jun. 24, 1991, Pat. No. 5,126,300, which is a continuation-in-part of Ser. No. 553,254, Jul. 16, 1990. This application Oct. 21, 1991, Ser. No. 779,645

Int. Cl.[5] B01J *8/00*; C01B *17/00*

U.S. Cl. 423—244.08 6 Claims

1. A method for removing SO_x from a gas stream which comprises:

(a) providing a dry physical mixture of a basic material selected from the group consisting of an alkaline earth metal oxide and an alkali metal hydroxide and a smectite clay;

(b) mixing the dry physical mixture to insure homogeneity of the mixture;

(c) adding a minimum amount of water to the dry physical mixture to make a paste;

(d) blending the paste in a carbon dioxide atmosphere to promote the formation of an alkaline earth metal carbonate from the basic material;

(e) drying the paste at a temperature up to about 100° C. to provide the composite material, wherein when the composite material is heated to a temperature of 500° C. or above, the SO_x components from a gas stream are removed by the composite material upon contacting with the said gas stream at that temperature.

5,160,716

PROCESS FOR MAKING HIGHLY REACTIVE SUB-MICRON AMORPHOUS TITANIUM DIBORIDE POWER AND PRODUCTS MADE THEREFROM

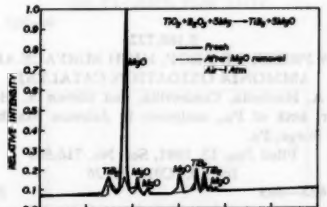
Kathryn V. Logan, Roswell, Ga., assignor to Georgia Tech Research Corporation, Atlanta, Ga.

Continuation-in-part of Ser. No. 903,265, Sep. 3, 1986, Pat. No. 4,888,166. This application Aug. 28, 1989, Ser. No. 399,329

The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.

Int. Cl.[5] C01B *35/04*

U.S. Cl. 423—297 5 Claims



1. A material of manufacture predominantly comprising non-pyrophoric sub-micron particulate titanium diboride, said material being formed by a process which comprises the steps of:

(a) forming a powdered reaction mixture comprising titanium oxide, boron oxide, and magnesium;

(b) exothermically reacting in a self-propagating reaction, the reaction mixture in an atmosphere including air to yield a reacted mass containing titanium diboride and magnesia;

(c) leaching the reacted mass with a leaching solution having a pH in the range of about 0.5 to about 8; and

(d) recovering non-pyrophoric sub-micron particulate titanium diboride powder of highly reactive form having an average particle size of one micron or less from the leaching solution.

5,160,717

TITANIUM-ALUMINUM-SILICON-OXIDE MOLECULAR SIEVE COMPOSITIONS

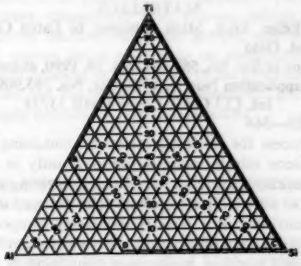
Brent M. T. Lok, Shanghai, China; Bonita K. Marcus, Rye, and Edith M. Flanigen, White Plains, both of N.Y., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 291,328, Dec. 28, 1988, abandoned, which is a continuation of Ser. No. 56,358, May 28, 1987, abandoned, which is a continuation of Ser. No. 604,155, Apr. 26, 1984, abandoned. This application Jun. 28, 1990, Ser. No. 545,153

The portion of the term of this patent subsequent to Jan. 9, 2007, has been disclaimed.

Int. Cl.[5] C01B *33/34*

U.S. Cl. 423—704 14 Claims



1. A crystalline molecular sieve having a three-dimensional microporous framework structure of TiO_2, AlO_2 and SiO_2 tetrahedral units, having an intracrystalline pore system where the pores have nominal diameters of about 6 Angstroms and having a chemical composition on an anhydrous basis expressed by the formula:

$$mR: (Ti_xAl_ySi_z)O_2$$

where "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the moles of "R" present per mole of $(Ti_xAl_ySi_z)O_2$ and has a value from zero to about 0.3; and "x", "y", and "z" represent the mole fractions of titanium, aluminum, and silicon, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the compositional area defined by points A, B, C, and D of the ternary diagram of FIG. 1 and having a characteristic X-ray pattern as set forth in Table III

TABLE III

2Θ	d, (Å)	Relative Intensity
7.9–8.0	11.17–11.10	m-vs
8.8–8.9	10.03–9.97	m
23.1–23.3	3.85–3.82	m-vs
23.7–23.8	3.76–3.75	m
23.9–24.0	3.73–3.71	m
24.4–24.5	3.66–3.63	m.

5,160,718

METHOD OF PRODUCING KENYAITE-TYPE PHYLLOSILICATE

Katsunori Kosuge, and Atsumu Tsunashima, both of Tsukuba, Japan, assignors to Director-General of Agency of Industrial Science and Technology, Japan

Filed Mar. 13, 1991, Ser. No. 669,093
Claims priority, application Japan, May 8, 1990, 2-118472
Int. Cl.[5] C01B 33/32
U.S. Cl. 423—332 8 Claims

1. A method of producing a kenyaite-type phyllosilicate, comprising hydrothermally reacting a mixture containing amorphous silica, sodium hydroxide, potassium carbonate and water at a temperature of 100°–180° C. for 3–48 hours to form crystallographically single phase phyllosilicate having the same layer structure as kenyaite, said mixture having a composition providing the following molar ratios:

H_2O/SiO_2: 15–20

sodium hydroxide [compound]/SiO_2: 0.18–0.30

potassium carbonate [compound]/SiO_2: 0.005–0.30

sodium hydroxide [compound]/potassium carbonate [compound]: 1.1–25.

5,160,719

PROCESS FOR NITRIDING SILICON CONTAINING MATERIALS

James P. Edler, Troy, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 557,194, Jul. 24, 1990, abandoned. This application Nov. 4, 1991, Ser. No. 785,909
Int. Cl.[5] C01B 33/00; C04B 35/58
U.S. Cl. 423—344 13 Claims

1. A process for nitriding materials containing silicon to form a silicon nitride material predominantly in the alpha-phase, comprising nitriding the silicon-containing material by subjecting to a nitriding atmosphere at an elevated temperature to effect nitriding at a linearly increasing temperature rate during nitriding for a time period of between about 7 and about 90 hours, said nitriding atmosphere containing at least nitrogen, helium and hydrogen gas, and the composition of said nitriding atmosphere being kept constant by maintaining the partial pressures within the nitriding atmosphere by the monitored addition of only the nitrogen gas component, even though the nitrogen component is being consumed during the nitriding.

5,160,720

METAL CATALYZED PRODUCTION OF TETRACHLOROSILANE

Roland L. Halm, Madison, Ind., and Regie H. Zapp, Carrollton, Ky., assignors to Dow Corning Corporation, Midland, Mich.

Filed Dec. 12, 1990, Ser. No. 627,803
Int. Cl.[5] C01B 33/107
U.S. Cl. 423—342 12 Claims

1. A process for preparing silanes of formula H_nSiCl_{4-n}, where n is an integer from 0 to 4, the process consisting essentially of: contacting silicon with hydrogen chloride in the presence of an effective concentration of a catalyst, which increases yield of tetrachlorosilane, selected from a group consisting of tin and tin compounds, nickel and nickel compounds, arsenic and arsenic compounds, palladium and palladium compounds, and mixtures thereof; at a temperature of about 250° C. to 500° C.

5,160,721

PROCESS FOR MAINTAINING HIGH LEVEL OF YIELD OF ACRYLONITRILE AND HYDROGEN CYANIDE IN AMMOXIDATION OF PROPYLENE

Yutaka Sasaki; Yutaka Kiyomiya; Toshio Nakamura; Kunio Mori, and Akimitsu Morii, all of Kanagawa, Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,526
Claims priority, application Japan, Oct. 5, 1987, 62-249707; Jul. 26, 1988, 63-184522
Int. Cl.[5] C01C 3/02; C07C 253/26
U.S. Cl. 423—376 9 Claims

1. A process for conducting long-term ammoxidation of propylene in the presence of a metal oxide catalyst for ammoxidation of propylene at a temperature of from 300° C. to 500° C. to produce acrylonitrile and hydrogen cyanide where yields of acrylonitrile and hydrogen cyanide are maintained at the level of or more than that obtained with the fresh metal oxide catalyst, wherein each of

(A) elemental phosphorus or a phosphorus compound and

(B) elemental tellurium or a tellurium compound is added as a catalyst regenerating agent at least once to the ammoxidation reaction system as the reaction progresses, said regenerating agent (A) is added when the yields of both of acrylonitrile and hydrogen cyanide are reduced as compared to the yields obtained with the fresh metal oxide catalyst, and the regenerating agent (B) is added when the yield of acrylonitrile is reduced and the yield of hydrogen cyanide is unchanged or increased compared to the yield obtained with the fresh metal oxide catalyst.

5,160,722

LOW PRESSURE DROP, HIGH SURFACE AREA AMMONIA OXIDATION CATALYST

William A. Hochella, Coatesville, and Steven A. Heffernen, Ambler, both of Pa., assignors to Johnson Matthey, Inc., Valley Forge, Pa.

Filed Jun. 17, 1991, Ser. No. 716,539
Int. Cl.[5] C01B 21/26
U.S. Cl. 423—403 20 Claims

1. The method for the catalytic oxidation of ammonia at temperatures above 850° C. which comprises using as catalyst a foraminate element fabricated from metal consisting essentially of a metal selected from the group consisting of platinum, rhodium, palladium and alloys of mixtures thereof characterized by (a) a novel configuration whereby the initial product of the formula: curve to flat ratio (C/F) multiplied by mesh count per inch (N) and wire diameter in inches (d_w) for said element is greater than at least about 0.08 but less than about 10 and (b) where, for a given ammonia throughput, the conversion efficiency is a function of the curve to flat ratio (C/F), wire diameter (d_w) and mesh count (N) combination and conversion efficiency is improved by increasing the mesh count (N) at a given wire diameter, increasing the wire diameter (d_w) at a given mesh count, and increasing the curve to flat ratio (C/F) to a ratio of above 1.0.

5,160,723

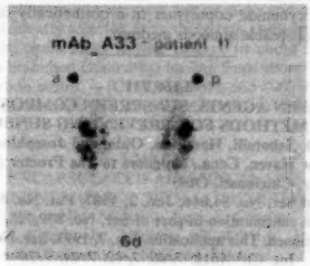
METHOD OF IMAGING COLORECTAL CARCINOMA LESION AND COMPOSITION FOR USE THEREIN

Sydney Welt; Chaitanya R. Divgi; Samual Yeh; Lloyd J. Old, all of New York, N.Y.; Herbert F. Oettgen, New Canaan, Conn.; Francisco X. Real, Barcelona, Spain, and Junichi Sakamoto, Chikusaku Nagoya, Japan, assignors to Sloan-Kettering Institute For Cancer Research, New York, N.Y.

Division of Ser. No. 327,765, Mar. 23, 1989, abandoned, and a continuation-in-part of Ser. No. 118,411, Nov. 6, 1987, abandoned, which is a continuation of Ser. No. 724,991, Apr. 19, 1985, abandoned. This application Mar. 18, 1991, Ser. No. 671,132

Int. Cl.[5] A61K *49/02*; C07K *15/28, 15/00*

U.S. Cl. 424—1.1 8 Claims



1. The monoclonal antibody AS 33 (HB 8779).

2. The hybridoma cell line which produces the monoclonal antibody of claim 1.

5,160,724

BARIUM SULFATE CONTRAST MEDIUM FOR X-RAY EXAMINATION OF THE LARGE INTESTINE

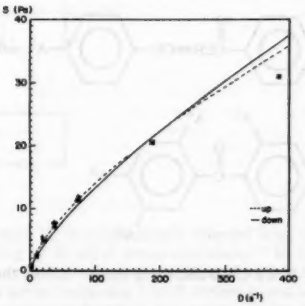
Yoshito Tonariya, Tokyo; Yukihito Wada, Saitama; Kazuhiro Yamaguchi, Higashimatsuyama; Tomio Yamazaki, Saitama; Isamu Sakai, Funabashi; Shigeru Yokoi, Tokyo; Mitsuo Togashi, Oyama, and Yukihiro Noguchi, Omiya, all of Japan, assignors to Ohta Seiyaku Kabushiki Kaisha, Saitama, Japan

Filed Sep. 19, 1989, Ser. No. 409,296

Claims priority, application Japan, Sep. 22, 1988, 63-236272

Int. Cl.[5] A61K *49/4, 33/14*

U.S. Cl. 424—4 1 Claim



1. A contrast medium for use for X-ray examination of the large intestine according to the double contrast method, in the form of an enema which comprises an aqueous suspension containing 20 to 30 W/V % of barium sulfate, 2.0 to 0.5 W/V % of gum tragacanth, and one or more suspending agents selected from the group consisting of sodium carboxymethyl cellulose and gum arabic.

5,160,725

MAGNETIC LIQUID COMPOSITIONS

Herbert Pilgrimm, Berlin, Fed. Rep. of Germany, assignor to Silica Gel Gesellschaft mbH Adsorptions-Technik, Apparatebau, Berlin, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 173,590, Mar. 25, 1988, abandoned. This application Jan. 4, 1991, Ser. No. 638,134

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1987, 3709851

Int. Cl.[5] A61K *49/00*

U.S. Cl. 424—9 11 Claims

1. A magnetic liquid composition, comprising:

(a) a dispersion of superparamagnetic iron oxide and iron particles dispersed in an amount of from 0.1% to 50% by weight in water or aqueous salt solution, and in an amount of from 10% to 100% by weight of at least one of

(b) reactive aggregation preventing organic substances of ω-alkoxy-polyethyleneglycols containing phosphate and phosphonate, polyethylene glycol/polypropyleneglycol containing phosphate and phosphonate, phosphoric acid-containing nucleotides, their oligomers or polymers, carbohydrates containing phosphoric acid groups, which have one chemically reactive phosphate and phosphonate group for the chemical bonding to the surface of the superparamagnetic particles, and

(c) reactive aggregation preventing organic substances of polyethylene glycols, ω-aminoalkoxy-polyethyleneglycols, ω-oxoalkoxy-polyethyleneglycols containing phosphate and phosphonate, phosphoric acid-containing nucleotides, their oligomers or polymers, carbohydrates containing phosphoric acid groups, which have two chemically reactive functional groups, one of the functional groups being phosphate or phosphonate for the chemical bonding to the surface of the superparamagnetic particles and the other reactive functional group serving to couple covalently organic molecules.

5,160,726

FILTER STERILIZATION FOR PRODUCTION OF COLLOIDAL, SUPERPARAMAGNETIC MR CONTRAST AGENTS

Lee Josephson, Arlington; Ernest V. Groman, Brookline, and Stephen Palmacci, Walpole, all of Mass., assignors to Advanced Magnetics Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 480,677, Feb. 15, 1990, abandoned. This application Feb. 5, 1991, Ser. No. 650,957

Int. Cl.[5] G01N *24/00, 31/00*; A61K *33/26, 31/715*

U.S. Cl. 424—9 20 Claims

1. An improved method, for obtaining an in vivo MR image of an organ or tissue of an animal or human subject, of the type including administering to such subject as a contrast agent to enhance such MR image an effective amount of a colloid including superparamagnetic metal oxide particles dispersed in a physiologically acceptable carrier, in such a manner as to provide a reduction in toxicity in comparison with that associated with administration of the colloid after terminal sterilization, wherein the improvement comprises preparing and sterilizing the colloid in a manner that avoids subjecting the resulting active ingredient to heat stress.

5,160,727

TUMOR CELL SENSITIZATION METHOD USING QUINAZOLINEDIONE DERIVATIVES

Wayne Klohs, Ann Arbor, Mich., and Avner Ramu, Jerusalem, Israel, assignors to Warner-Lambert Company, Morris Plains, N.J. and Hadasit Medical Research Services and Development, Jerusalem, Israel

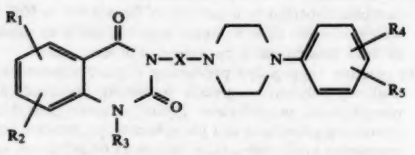
Continuation-in-part of Ser. No. 479,320, Feb. 13, 1990, abandoned. This application Mar. 21, 1990, Ser. No. 497,049

Int. Cl.[5] A61K *49/00, 31/70, 31/525, 31/44*

U.S. Cl. 424—10 2 Claims

1. A method of treating a patient having cancer cells which

are resistance to multiple drugs which comprises administering to said patient an anticancer agent selected from the group consisting of vinblastine, vincristine, doxorubicin, daunorubicin, trimetrexate, piritrexim, etoposide, 7,10-dihydroxy-2-[2-[(2-hydroxyethyl)amino]ethyl]-5-[[2-(methylamino)ethyl-]amino]anthra[1,9-cd]pyrazol-6-(2H)-one dihydrochloride, 5-[(2-aminoethyl)amino]-2-[2-(diethylamino)ethyl]-2H-[1]benzothiopyrano[4,3,2-cd]indazol-8-ol trihydrochloride, and taxol and an amount of a compound of the following formula which is capable of rendering the resistant cells sensitive to anticancer agents:



wherein X is an alkylene chain having from three to seven carbon atoms; each of R_1 and R_2 is hydrogen, chlorine, fluorine, bromine, or lower alkoxy having from one to four carbon atoms and which is straight or branched; R_3 is hydrogen or a straight or branched lower alkyl of from one to three carbon atoms; each of R_4 and R_5 is hydrogen, chlorine, fluorine, bromine, or lower alkylthio having from one to four carbon atoms and which is straight or branched with the proviso that one of R_4 and R_5 is other than hydrogen; or a pharmaceutically acceptable acid-addition salt thereof.

5,160,728

PREPARATION FOR IRON SUPPLY, PREPARATION FOR VITAMIN SUPPLY AND METHOD FOR STABILIZING A FOAM PREPARATION

Akihisa Takaichi; Toshihiko Okamoto, and Toshiaki Matsumoto, all of Tokushima, Japan, assignors to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan

Division of Ser. No. 417,111, Oct. 4, 1989, Pat. No. 5,087,442. This application Jun. 19, 1990, Ser. No. 540,532

Claims priority, application Japan, Oct. 4, 1988, 63-250663; Dec. 2, 1988, 63-306272

Int. Cl.[5] A61L *9/04;* **A61K** *33/00, 31/34, 31/295*

U.S. Cl. 424—44 **27 Claims**

1. In a foam preparation comprising a foaming effective amount of sodium carbonate or sodium hydrogencarbonate, and a neutralizing effective amount of a neutralizing agent, wherein the neutralizing agent is an acid compound which neutralizes said sodium carbonate and/or sodium hydrogencarbonate to generate acid gas, the improvement comprising a storage stabilizing effective amount of potassium carbonate in said foam preparation.

5,160,729

HIGH WATER CONTENT HAIR SPRAY COMPOSITION

Robert Login, Oakland; Carmen D. Bires, Hackettstown, and Edward W. Walls, Jr., Cranford, all of N.J., assignors to ISP Investments Inc., Wilmington, Del.

Filed Jul. 24, 1991, Ser. No. 734,975

Int. Cl.[5] A61K *7/11*

U.S. Cl. 424—47 **7 Claims**

1. A low VOC hair spray composition which forms uniform, fine liquid spray patterns on hair which are spread out along substantially the entire length of the individual hair shafts so that substantially no liquid droplets remain thereon consisting essentially of about 3–10% by weight of a hair fixative resin, at least 14% by weight of water, 80% by weight or less of an alcohol, and about 0.1–1% by weight of an N-alkyl pyrrolidone having an alkyl group with from 4–22 carbon atoms.

5,160,730

USE OF AN AQUEOUS DISPERSION BASED ON ORGANOPOLYSILOXANES AND ON A CROSSLINKED AMMONIUM ACRYLATE/ACRYLAMIDE COMPOLYMER IN COSMETICS, FOR THE TREATMENT OF HAIR OR THE SKIN AND/OR IN DERMATOLOGY

Claude Dubief, Le Chesnay, and Daniele Cauwet, Paris, both of France, assignors to L'Oreal, France

Filed Oct. 18, 1990, Ser. No. 599,611

Claims priority, application France, Oct. 20, 1989, 89 13787

Int. Cl.[5] A61K *7/42, 7/075*

U.S. Cl. 424—59 **22 Claims**

1. An aqueous dispersion intended for the cosmetic treatment of hair or the skin and/or in dermatology, which contains at least an organopolysiloxane and a crosslinked ammonium acrylate/acrylamide copolymer in a cosmetically or physiologically acceptable aqueous medium.

5,160,731

SUNSCREEN AGENTS, SUNSCREEN COMPOSITIONS AND METHODS FOR PREVENTING SUNBURN

Anthony D. Sabatelli, Hamilton, Ohio, and Josephine A. Spirnak, New Haven, Conn., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 54,046, Jun. 2, 1987, Pat. No. 4,999,186, which is a continuation-in-part of Ser. No. 879,725, Jun. 27, 1986, abandoned. This application Jan. 7, 1991, Ser. No. 638,129

Int. Cl.[5] A61K *7/40, 7/42, 7/44, 9/10*

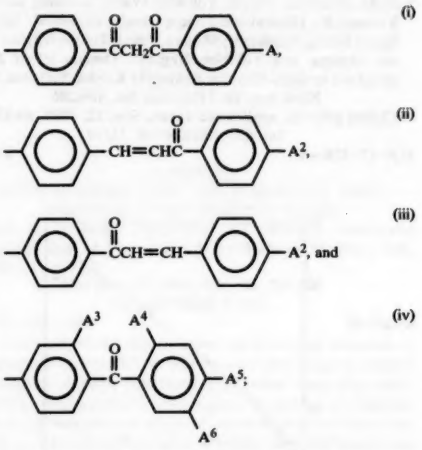
U.S. Cl. 424—59 **18 Claims**

1. A sunscreen compound having the structure:

X—Y—Z

wherein

(a) —X is a UVA-absorbing moiety selected from the group consisting of those having the structures:



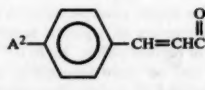
(i)

(ii)

(iii)

(iv)

(b) —Z is a UVB-absorbing moiety having the structure:



(c) —Y— is a linking moiety having the structure:

$$-(W^1(CR^2_2)_n)_mW^2-$$

wherein, in the above structures, —W^1— and —W^2— are independently selected from the group consisting of a single bond, —O— and —NR—; n is an integer from 1 to about 6; m is 1 or 2; each —R^2 is independently selected from the group consisting of —H, —OH, and straight chain alkyl having from 1 to about 20 carbon atoms branched chain alkyl having from 1 to about 20 carbon atoms; —A is selected from the group consisting of —R, —OR, —NR_2, and —SO_3H or its pharmaceutically-acceptable salt or ester; each —A^2 is independently —OR or —NR_2; —A^3 is —H or —OH; —A^4 and —A^5 are, independently, —R or —OR, and wherein further either —A^3 or —A^4 must be —OH; —A^6 is —H or —SO_3H or its pharmaceutically-acceptable salt or ester; and each —R is independently selected from the group consisting of —H, straight chain alkyl having from 1 to about 20 carbon atoms branched chain alkyl having from about 1 to about 20 carbon atoms, —(CH_2CH_2O)pH, and —$(CH_2CH(CH_3)O)$pH, wherein p is an integer from 1 to about 8.

5,160,732
ENCAPSULATED ALUMINUM AND ALUMINUM-ZIRCONIUM COMPOSITIONS

Dimitris E. Katsoulis, Midland; Lori J. Conway, Hope, and William J. Schulz, Jr., Midland, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 631,516, Dec. 21, 1990, abandoned. This application Aug. 7, 1991, Ser. No. 742,677
Int. Cl.[5] A61K *7/38*
U.S. Cl. 424—68 **26 Claims**

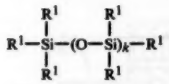
12. A method for producing encapsulated aluminum-zirconium salt compositions comprising

(A) mixing together

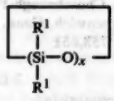
(i) an aqueous aluminum-zirconium salt selected from the group consisting of aluminum-zirconium halohydrates, and mixtures thereof;

(ii) a non-water miscible hydrophobic liquid selected from the group consisting of low viscosity silicone fluids, paraffin oil and mixtures thereof; and

(iii) a silicone carboxy acid, silicone carboxy acid derivative or mixture thereof selected from silicone carboxy acids or silicone carboxy acid derivatives having the formula



and



wherein each R^1 is independently selected from the group consisting of an alkyl group containing 1 to 30 carbon atoms, an aryl group containing 6 to 10 carbon atoms, an alkaryl group containing 7 to 20 carbon atoms, an aralkyl group containing 7 to 20 carbon atoms, a hydroxyl group, and a carboxy functional group having at least 2 carbon atoms, with the provision that at least one R^1 group is a carboxy functional group; k has the value of 1 to 1,000 and x has the value of 3 to 10;

(B) heating the mixture of (A) to remove substantially all free water; and

(C) recovering the encapsulated aluminum-zirconium salt.

5,160,733
CONDITIONING COMPOSITIONS WITH PERFLUOROPOLYMETHYLISOPROPYLETHERS

Marianne Berthiaume, Waterbury, and Janusz Jachowicz, Bethel, both of Conn., assignors to Clairol Inc., New York, N.Y.

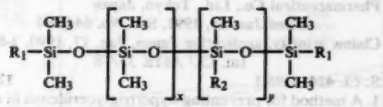
Filed May 6, 1991, Ser. No. 695,672
Int. Cl.[5] A61K *7/075*
U.S. Cl. 424—71 **14 Claims**

1. A hair conditioning composition comprising, by weight, based on the total weight of the composition:

a) from 0.1 to 5.0% of a perfluoropolyether selected from the group consisting of perfluoropolymethylisopropylether and polyhexafluoroisopropylether;

b) from 1.0 to 10.0% of a conditioning agent selected from the group consisting of:

i) amino-functional silicones having an amine content from 0.1 to 1.0 equivalent; and conforming to the formula:



wherein

R_1 is methyl, hydroxy, or methoxy;

R_2 is $(CH_2)_3NH(CH_2)_2NH_2$ or $CH_2CH(CH_3)CH_2NH(CH_2)_2NH_2$;

x and y are integers such that the molecular weight of the polymer ranges from 400–500,000, with the ratio of x/y being such that the amine content ranges from 0.1 to 1.0 equivalent and

ii) isothiuronium compounds containing one or more functional groups of the formula:

and

iii) mixtures thereof; and

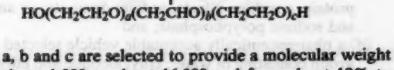
c) the balance being a cosmetically acceptable vehicle.

5,160,734
SUSTAINED RELEASE DELIVERY SYSTEM FOR SUBSTITUTED DIHYDROPYRIDINE CALCIUM CHANNEL BLOCKERS

Madurai G. Ganesan, Suffern, N.Y.; Narendra R. Desai, Danbury Fairfield, Conn.; Gary A. Maier, Orange, N.Y., and Prakash S. Kulkarni, Morris, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 125,440, Nov. 25, 1987, abandoned. This application Jan. 15, 1991, Ser. No. 641,610
Int. Cl.[5] A61K *9/22*
U.S. Cl. 424—78.38 **24 Claims**

1. A complex which comprises a 1,4-dihydropyridine complexed with a block copolymer having the general structure:



wherein a, b and c are selected to provide a molecular weight of from about 1,000 to about 16,000 and from about 10% to about 80% by weight of oxyethylene units said complex being obtained by reacting a 1:1 to 1:10 ratio of 1,4-dihydropyridine and said block copolymer in solution at a temperature of 25°–90° C. and thereafter recovering said complex.

5,160,735

PLASMINOGEN ACTIVATOR

Shigeyoshi Yasumura, Tokyo, Japan; Tatsunari Nishi, Los Angeles, Calif., and Seiga Ito, Kanagawa, Japan, assignors to Kyowa Hakko Kogyo Co. Ltd., Tokyo, Japan

Filed Jun. 14, 1990, Ser. No. 538,270
Claims priority, application Japan, Jun. 19, 1989, 1-156302
Int. Cl.[5] A61K *37/54*; C12N *9/72*
U.S. Cl. 424—94.63 6 Claims

1. A plasminogen activator which is identical in peptide sequence to naturally occurring human prourokinase except that the 155th amino acid from serine, the N-terminal amino acid, is threonine and the 153rd amino acid is selected from leucine, serine and asparagine.

5,160,736

COMPOSITION FOR PREVENTION OR TREATMENT OF HYPERTRIGLYCERIDEMIA

Shuhachi Kiriyama, Hokkaido, Japan, assignor to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Jan. 15, 1991, Ser. No. 641,494
Claims priority, application Japan, Jan. 17, 1990, 2-8050
Int. Cl.[5] A61K *35/78*
U.S. Cl. 424—195.1 12 Claims

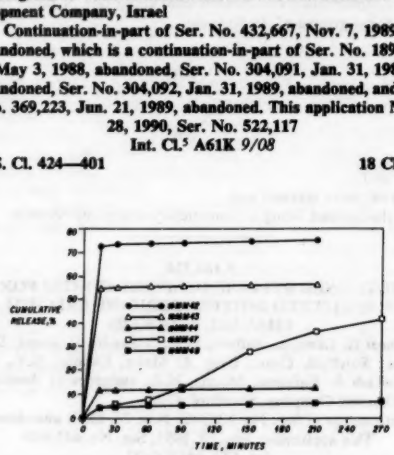
1. A method for preventing hypertriglyceridemia in a warm-blooded animal susceptible to hypertriglyceridemia, comprising orally administering an effective amount of purple layer to a warm blooded animal.

5,160,737

LIQUID POLYMER COMPOSITION, AND METHOD OF USE

Michael Friedman, and Amnon Sintov, both of Jerusalem, Israel, assignors to Perio Products Ltd. and Yissum Research Development Company, Israel

Continuation-in-part of Ser. No. 432,667, Nov. 7, 1989, abandoned, which is a continuation-in-part of Ser. No. 189,918, May 3, 1988, abandoned, Ser. No. 304,091, Jan. 31, 1989, abandoned, Ser. No. 304,092, Jan. 31, 1989, abandoned, and Ser. No. 369,223, Jun. 21, 1989, abandoned. This application Mar. 28, 1990, Ser. No. 522,117
Int. Cl.[5] A61K *9/08*
U.S. Cl. 424—401 18 Claims



1. A sustained-released liquid polymer composition which consists essentially of:

(a) one or more sustained release acrylic polymers;

(b) a pharmacological agent;

(c) a release adjusting agent selected from the group consisting of a cross-linking agent, a polysaccharide, a lipid, a protein, a sodium citrate, sodium docusate, an amino acid and sodium polyphosphate; and

(d) a pharmaceutically acceptable vehicle selected from the group consisting of water; ethyl alcohol; and ethyl alcohol and water,

wherein said sustained release acrylic polymers are selected from the group consisting of:

(1) a methacrylic acid type A copolymer, an anionic copolymer based on methacrylic acid and methylmethacrylate wherein the ratio of free carboxyl groups to the ester groups is approximately 1:1;

(2) a methacrylic acid type B compolymer, an anionic copolymer based on methacrylic acid and methylmethacrylate wherein the ratio of free carboxyl groups to the ester groups is approximately 1:2,

(3) a dimethylaminoethylacrylate/ethylmethacrylate copolymer, a copolymer based on acrylic and methacrylic acid esters with a low content of quaternary ammonium groups wherein the molar ratio of the ammonium groups to the remaining neutral (meth)acrylic acid esters is 1:20; and

(4) an ethyl methacrylate/chlorotrimethylammoniumethyl methacrylate copolymer, a copolymer based on acrylic and methacrylic acid esters with a low content of quaternary ammonium groups wherein the molar ratio of the ammonium groups to the remaining neutral (meth)acrylic acid esters is 1:40.

5,160,738

COSMETIC COMPOSITION

Ernest W. Macaulay, Bromborough, and Richard M. Williams, Caldy, both of England, assignors to Chesebrough-Pond's U.S.A. Co., Division of Conopco Inc., Greenwich, Conn.

Filed Jul. 9, 1991, Ser. No. 727,504
Claims priority, application United Kingdom, Jul. 9, 1990, 9015086
Int. Cl.[5] A61K *7/40*
U.S. Cl. 424—401 11 Claims

1. A cosmetic composition for topical application to human skin or hair consisting essentially of a blend of at least two polyol fatty acid polyesters, wherein a first polyol fatty acid polyester has a Melting Value of from −30° C. to +30° C. and a second polyol fatty acid polyester has a Melting Value of from +30° C. to +70° C., provided that the difference between the respective Melting Values is at least 5° C., the polyesters being formed from esterification between a polyol and at least 1 fatty acid, the polyol having at least 4 free hydroxyl groups, at least 60% of the hydroxyl groups being esterified, the fatty acids having from 8 to 22 carbon atoms, the composition having a Melting Value of from 20° C. to 60° C., as determined by the Melting Value Test.

5,160,739

COSMETIC COMPOSITION

Vispi Kanga, Shelton, Conn., assignor to Chesebrough-Pond's USA Co., Division of Conopco, Inc., Greenwich, Conn.

Filed Sep. 12, 1991, Ser. No. 758,651
Int. Cl.[5] A61K *7/02*
U.S. Cl. 424—401 7 Claims

1. A cosmetic oil and water emulsion comprising:

(i) from about 20 to about 80% water;

(ii) from about 1 to about 50% polyalphaolefin of viscosity from about 0.1 to about 10 cst. at 100° C.;

(iii) from about 0.1 to about 10% of a coupling-solubilizing agent which having the formula:

$$HO—(CH_2CHRO)_m(CH_2)_n(OCHRCH_2)_{m'}—OH$$

wherein m and m' are integers greater than 1, and n is an integer greater than 3; and R is selected from the group consisting of hydrogen, C_1–C_{12} alkyl and mixtures thereof.

5,160,740

MACROMOLECULAR ENDOPLASMIC RETICULUM

Etsuo Hasegawa, Ohmiya; Shinji Takeoka, Tokyo; Hiroyuki Ohno, Tokyo; Hiroyuki Nishide, Tokyo, and Eishun Tsuchida, Tokyo, all of Japan, assignors to Nippon Oil & Fats Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1990, Ser. No. 515,955

Claims priority, application Japan, Apr. 27, 1989, 1-110682; Feb. 14, 1990, 2-33256

Int. Cl.[5] A61K *9/127*

U.S. Cl. 424—450 8 Claims

1. A macromolecular endoplasmic reticulum which comprises a polymer obtained by polymerization of a mixture containing one or more polymerizable 2,4-diene phospholipids, cholesterol and one or more polymerizable 2,4-diene fatty acids, wherein the polymerizable 2,4-dienes are concentrated at the polar end of the fatty acids or the fatty acid component of the phospholipid.

5,160,741

REDUCTION OR PREVENTION OF SKIN IRRITATION BY DRUGS

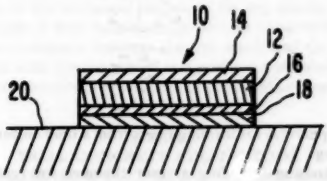
Michel J. N. Cormier; Philip W. Ledger, both of Mountain View, and Alfred Amkraut, Palo Alto, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Continuation of Ser. No. 549,584, Jul. 6, 1990, Pat. No. 5,130,139. This application Nov. 13, 1991, Ser. No. 793,932

The portion of the term of this patent subsequent to Jul. 14, 2009, has been disclaimed.

Int. Cl.[5] A61R *37/22*

U.S. Cl. 424—450 25 Claims



1. A method of reducing or preventing human skin irritation during transdermal administration to a human of a weak base drug, which drug is capable of accumulating in the lysosomes and is susceptible to inducing skin irritation in the human when the drug is transdermally administered, the method comprising coadministering to a selected site on the skin or mucosa of the human:

(a) a therapeutically effective amount of the weak base drug, at a therapeutically effective rate over a predetermined period of time; and

(b) an effective amount of a lysosomal uptake-inhibiting agent capable of inhibiting the lysosomal uptake of the drug to reduce or prevent irritation to the skin or mucosa, the amount of the lysosomal uptake-inhibiting agent being from 0.01 wt % to 20 wt % of the drug/agent composition.

5,160,742

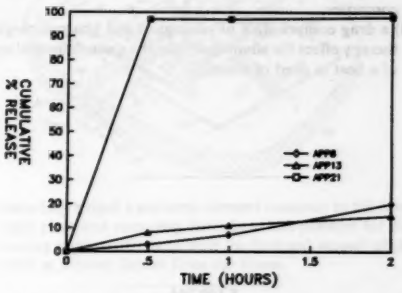
SYSTEM FOR DELIVERING AN ACTIVE SUBSTANCE FOR SUSTAINED RELEASE

Terrence B. Mazer, Reynoldsburg, Ohio; Glenn A. Meyer, Waukegan, Ill.; Shie-Ming Hwang, Arlington, Ohio; Edrick L. Candler, Jr., Dublin, Ohio; Lonnie R. Drayer, Gahanna, Ohio, and Andre Daab-Krzykowski, Columbus, Ohio, assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Dec. 31, 1991, Ser. No. 816,412

Int. Cl.[5] A61K *9/26, 9/14*

U.S. Cl. 424—469 40 Claims



1. A system for delivery of an active substance for sustained release in the intestinal tract, comprising a particle having a core containing an active substance, said core being encapsulated by at least two layers of coating materials, one of said layers of a coating material consisting essentially of a prolamine and at least one material selected from the group consisting of plasticizers and hydrophobic substances and the other layer a coating material consisting essentially of an enteric compound and at least one material selected from the group consisting of plasticizers and anti-tackiness agents, such that said other layer is generally resistant to disintegration in human gastric juices but will disintegrate in human intestinal fluids.

5,160,743

ANNEALED COMPOSITION FOR PHARMACEUTICALLY ACCEPTABLE DRUG

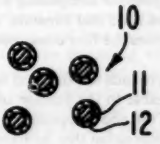
David E. Edgren, El Granada, and Felix Theeuwes, Los Altos, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 350,482, May 11, 1989, Pat. No. 5,006,346, which is a division of Ser. No. 187,621, Apr. 28, 1988, Pat. No. 4,931,285. This application Jan. 28, 1991, Ser. No. 647,321

The portion of the term of this patent subsequent to Apr. 9, 2008, has been disclaimed.

Int. Cl.[5] A61K *9/24*

U.S. Cl. 424—473 1 Claim



1. An annealed composition for a pharmaceutically acceptable dosage form comprising:

(a) a first oil-in-water composition comprising 15% to 95% of a member selected from the group consisting of a cellulose ether, a cellulose ester and a cellulose ester-ether, 2% to 75% of a plasticizer, and 0.1% to 20% of an emulsifying

agent comprising a member selected from the group consisting of a nonionic, anionic and cationic agent;

(b) a second composition comprising a member selected from the group consisting of a hydroxypropylcellulose, hydroxypropylmethylcellulose, carboxymethylcellulose and methylcellulose, and optionally a plasticizer, and wherein the first composition and the second composition are annealed at a temperature up to 85° C. for up to 72 hours to yield an annealed composition, and wherein said;

(c) annealed composition coats a dosage form selected from the group consisting of an osmotic, tablet, capsule, powder, granule, and bead dosage form, which dosage forms comprises;

(d) a drug comprising a physiological and pharmacological therapy effect for admittance into the gastrointestinal tract of a host in need of therapy.

5,160,744

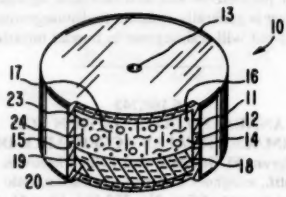
VERAPMIL THERAPY

Frank Jao, San Jose; Patrick S. Wong, Palo Alto; Hoa T. Huynh, Fremont; Kathy McChesney, Cupertino, and Pamela K. Wat, Santa Clara, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Filed Jun. 27, 1991, Ser. No. 722,622

Int. Cl.[5] A61K *9/24*

U.S. Cl. 424—473 **11 Claims**



1. A dosage form for the delayed-delivery of a drug, wherein the dosage form comprises:

(a) a first composition comprising 0.05 nanograms to 1.5 grams of the drug verapamil and 20 wt % to 50 wt % of a poly(ethylene oxide) present in the first composition, said poly(ethylene oxide) comprising means for changing from a nondispensable viscosity to a dispensable viscosity when contacted by fluid that enters the dosage form;

(B) a second composition comprising a polymeric composition that imbibes fluid and expands, whereby the second composition pushes the first composition from the dosage form;

(C) a wall that surrounds the first and second compositions, said wall permeable to the passage of fluid present in the environment of use and comprises 35 wt % to 55 wt % of a polymeric composition that hydrates slowly when contacted by fluid that enters the wall;

(D) at least one exit means in the wall for delivering the drug from the dosage form; and, wherein the dosage form is characterized by:

(E) a delayed-drug interval for delivering verapamil up to 4.5 hours provided by (A), (B) and (C) operating in combination as a unit to provide the delayed-drug interval.

5,160,745

BIODEGRADABLE MICROSPHERES AS A CARRIER FOR MACROMOLECULES

Patrick P. DeLuca, Lexington, Ky., and Frantisek Rypacek, Leckova, Czechoslovakia, assignors to The University of Kentucky Research Foundation, Lexington, Ky.

Continuation of Ser. No. 152,843, Feb. 5, 1988, abandoned, which is a division of Ser. No. 864,147, May 16, 1986, Pat. No. 4,741,872. This application Jan. 9, 1990, Ser. No. 463,008

Int. Cl.[5] A61K *9/14, 9/50, 9/52*; B01J *13/18*

U.S. Cl. 424—487 **13 Claims**

1. A porous microsphere comprising a biodegradable polymeric structure having a three-dimensional polymeric network in which a biologically active macromolecular agent is physically entrapped therein and not substantially bonded to the polymeric network, said polymeric structure comprising a vinyl derivative of a biodegradable hydrophilic polymer copolymerized with a water-soluble monovinyl monomer, said macromolecular agent able to be released at a controlled rate by diffusion out of the pores and by degradation of the polymeric structure.

5,160,746

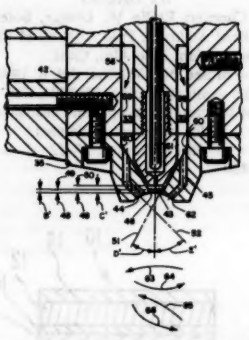
APPARATUS FOR FORMING A NONWOVEN WEB

Richard N. Dodge, II, Roswell; Ann L. Wagner, Cummings, both of Ga.; Larry C. Fowler, Clearwater, Fla.; Martin A. Allen, Gainesville, and John T. Fetcko, III, Dawsonville, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 362,737, Jun. 7, 1989, abandoned. This application Jul. 18, 1991, Ser. No. 732,449

Int. Cl.[5] B05B *7/00*

U.S. Cl. 425—7 **13 Claims**



1. An apparatus for forming fibers from a fiber-forming resin comprising:

a die housing including a resin chamber for receiving a supply of molten fiber-forming resin, said chamber having a resin outlet orifice in fluid communication therewith for emitting said molten resin in the form of a flow, said flow defining a first axis, and

primary fiberization means completely surrounding said resin outlet orifice for drawing said resin into fibers, said primary fiberization means including a fluid outlet port in said die housing completely surrounding said flow of resin from said resin outlet orifice and a primary fiberization fluid emanating from said fluid outlet port for fiberizing said resin to form fibers, said primary fiberization fluid contacting said flow of resin at a primary fluid flow angle of between about 15 and 60 degrees, said angle being measured as an interior angle between the intersection of the first axis of said flow of resin and a line tangent tot he flow of said primary fiberization fluid.

said die housing further including a nozzle located therein and a least partially surrounded by a fiberization fluid

chamber which terminates in said fluid outlet port, said nozzle including said resin chamber and said resin outlet orifice, said nozzle having a nozzle exterior surface, said nozzle exterior surface having a plurality of flutes adjacent said resin outlet orifice to direct said primary fiberization fluid.

5,160,747

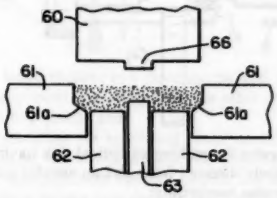
APPARATUS FOR MANUFACTURING CERAMIC CHIP-RESISTANT CHAMFERED INTEGRATED CIRCUIT PACKAGE

Takayasu Kizaki; Chong-il Park, and Reiichi Yamada, all of San Diego, Calif., assignors to Kyocera America, Inc., San Diego, Calif.

Division of Ser. No. 595,310, Oct. 10, 1990, Pat. No. 5,095,360. This application Aug. 5, 1991, Ser. No. 740,807

Int. Cl.[5] B29C *43/32, 43/02*

U.S. Cl. 425—352 **3 Claims**



1. An apparatus for making a ceramic chip-resistant integrated circuit package component with at least one integrally-formed end chamfer, the component having an exposed surface, an opposing inner surface, and opposing end surfaces, the apparatus including a die press for forming the ceramic component, the die press having a floating punch, a top punch having a horizontal surface including a boss means for defining a depression within the final form of the component for accommodating an integrated circuit, wherein the boss coincides with the floating punch, a bottom punch, and a die case conforming to the general shape of the component and having at least one chamfered end wall, the chamfer having:

a. an angle of from about 20° to about 85° relative to the plane of the horizontal surface of the top punch; and

b. a height H that is from about 20% to about 67% of the vertical distance between the top punch and the bottom punch with the top punch in a position maintained when the ceramic component is being fully compressed.

5,160,748

DUAL CONCRETE EDGING TOOL

Jim Gauuan, Stockton, Calif., assignor to Gauuan Construction Co., Inc., Stockton, Calif.

Filed Nov. 19, 1990, Ser. No. 615,318

Int. Cl.[5] B28B *11/08, 1/29*

U.S. Cl. 425—458 **12 Claims**

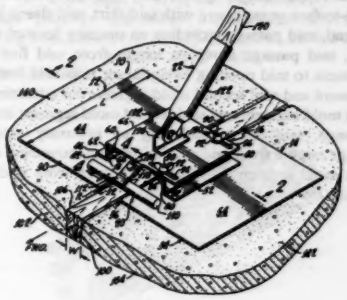
1. A combination dual concrete edging tool and joint maker apparatus which comprises:

a. first and second edging tools, each edging tool comprising a flat plate having a depending edging lip, said edging lip being narrow as compared to the flat plate;

b. a frame comprising a rigid plate having dimensions substantially smaller than the flat plates of the first and second edging tools;

c. means for mounting said first and second edging tools to said frame with said depending edging lips in parallel opposition to one another, said mounting means including adjusting means for enabling a distance between said depending edging lips to be adjusted from zero in order that the tool apparatus can be used as a joint maker, to a distance selected to enable the tool apparatus to be used as a dual concrete edger; and

d. edging tool back-up means for increasing the rigidity of the first and second edging tools, said back-up means



including a rigid transverse element mounted to the frame rigid plate and extending therefrom in a position for contacting upper surfaces of both the first and second edging tools at a point distant from the frame.

5,160,749

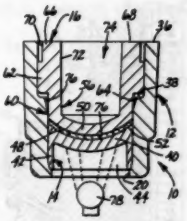
THREE PIECE MOLD ASSEMBLY FOR MAKING AN OCULAR DEVICE

Terence M. Fogarty, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 605,941, Oct. 30, 1990, abandoned. This application Mar. 31, 1992, Ser. No. 863,357

Int. Cl.[5] B29D *11/00*

U.S. Cl. 425—412 **19 Claims**



1. A mold assembly for making an ocular device comprising:

a sleeve having a passage;

a first mold segment removably received in said passage; and

a second mold segment removably received in said passage at a location spaced from said first mold segment to present a mold cavity therebetween.

said first mold segment having a base adjacent said mold cavity and a peripheral skirt extending in a direction away from said mold cavity, said base and said skirt defining an open recess, said sleeve extending along said skirt and being in contact with said skirt for aligning said first mold section with said sleeve, said skirt including an end portion remote from said base, said end portion having a certain cross-sectional area, said passage next to said end portion having a cross-sectional area slightly less than said cross-sectional area of said end portion in order to establish a leak-resistant fluid seal.

15. A mold assembly for making an ocular device comprising:

a sleeve having a passage with a certain central axial length;

a first mold segment removably received in said passage; and

a second mold segment in engagement with said sleeve, said

second mold segment being removably received in said passage at a location spaced from said first mold segment to present a mold cavity therebetween,

said first mold segment including a peripheral, cylindrical skirt,

said sleeve including a cylindrical section in complemental, face-to-face engagement with said skirt, said sleeve having an end, said passage including an opening located at said end, said passage along its length from said first mold segment to said opening being larger than said first mold segment and said second mold segment for admitting said first mold segment and said second mold segment into said passage, said sleeve including an inwardly extending flange remote from said end for limiting movement of said first mold segment in a direction away from said mold cavity.

5,160,750

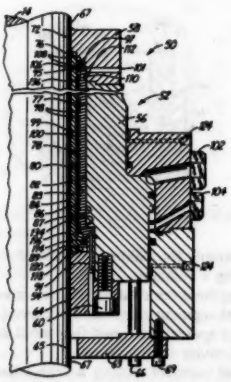
DIFFERENTIAL PITCH THREAD CLAMP ASSEMBLY

James D. Holbrook, Maple Grove, Minn., assignor to MTS Systems Corporation, Eden Prairie, Minn.

Filed Aug. 15, 1991, Ser. No. 745,417

Int. Cl.[5] B30B *15/00*

U.S. Cl. 425—451.9 **16 Claims**



1. A clamp assembly for selectively clamping to a column, the clamp assembly comprising:

a threaded inner clamp portion positioned concentrically around the column, the threaded inner clamp portion having an inner surface for selectively engaging the column and a threaded outer surface having an inner clamp thread pitch;

a threaded outer clamp portion having a threaded inner surface with an outer clamp thread pitch, the inner and outer threaded surfaces mating concentrically about the column with sufficient clearance to define a selectively pressurized chamber and having a difference in thread pitch between the inner clamp thread pitch and the outer clamp thread pitch.

5,160,751

APPARATUS FOR MAKING A DATA-CARRYING OPTICAL DISK

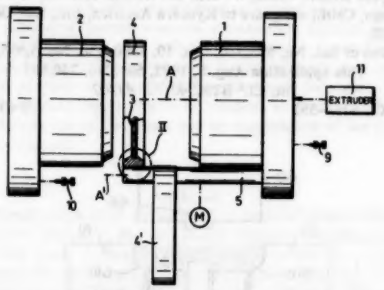
Martin Eichlseder, Tettenweis, and Peter Lichtinger, Fürstenfeldbruck, both of Fed. Rep. of Germany, assignors to Krauss-Maffei Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 14, 1991, Ser. No. 669,357

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1990, 4008310

Int. Cl.[5] B29C *45/40*

U.S. Cl. 425—556 **8 Claims**



1. An apparatus for making an optical disk having a pair of axially oppositely directed faces and an annular outer periphery, the apparatus comprising:

a pair of axially spaced and axially relatively displaceable mold parts;

a ring axially alignable between the parts and having an inner periphery forming with the parts a substantially closed mold cavity corresponding to the shape of the disk;

means for filling the cavity with a hot hardenable resin that shrinks when cooled, whereby the parts form the respective disk faces and an inner periphery of the ring forms the outer periphery of the disk, one of the peripheries being radially concave and the other of the peripheries being complementary radially convex, whereby the disk outer periphery is captured in the ring inner periphery;

means for axially oppositely separating the parts from each other and from the disk to leave the disk in the ring with both of the disk faces exposed after at least partial hardening of the resin in the cavity; and

means for transversely displacing the ring with the disk engaged in the ring out from between the mold parts, the inner periphery of the disk having a diameter such that on cooling and shrinking the outer periphery of the disk separates from the inner periphery of the ring and the disk separates from the ring.

5,160,752

MOLD FOR FORMING A TAPE CASSETTE REEL

Kiyoshi Urayama, and Masanori Sato, both of Miyagi, Japan, assignors to Sony Corporation, Tokyo, Japan

Division of Ser. No. 447,373, Dec. 7, 1989. This application Apr. 10, 1991, Ser. No. 682,970

Claims priority, application Japan, Dec. 28, 1988, 63-331332

Int. Cl.[5] B29C *45/00*

U.S. Cl. 425—577 **7 Claims**

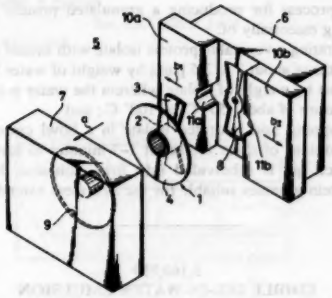
1. An apparatus for molding a tape cassette reel having upper and lower flanges and a hub connected between the upper and lower flanges, the molding apparatus comprising:

(a) an upper mold having a face with a cavity therein for molding the upper flange;

(b) a lower mold having a face with a disc shaped cavity therein for molding the lower flange, the upper and lower molds being oriented during the molding process so that their faces with the respective cavities are opposed to each

other and the lower mold being selectively slidable in a direction perpendicularly away from the face of the upper mold;

(c) first and second hub molds provided between the upper and lower molds, the first and second hub molds each having an opposing face which has a semicylindrical cavity therein, at least one of the first and second hub



molds being slidable in a direction parallel to the face of the upper mold and away from the other of the first and second hub molds; and

(d) wherein when the upper and lower molds and the first and second hub molds are slid into position against each other, the respective cavities therein are all contiguous whereby a unitary tape cassette reel can be molded.

5,160,753

METHOD OF PREPARING AN AQUEOUS FOOD SUPPLEMENT FOR CATTLE AND THUS PREPARED FOOD SUPPLEMENT

Jan Van Benthem, Yde, and Koos Van Etten, Dordrecht, both of Netherlands, assignors to Van Epenhuysen Chemische Fabrieken b.v., Zwijndrecht, Netherlands

Continuation of Ser. No. 687,958, Apr. 19, 1991, abandoned. This application Mar. 11, 1992, Ser. No. 849,818

Claims priority, application Netherlands, Apr. 26, 1990, 9000996

Int. Cl.[5] A23K *1/00*

U.S. Cl. 426—2 **15 Claims**

1. In a method for preparing an aqueous food supplement for cattle comprising dissolved macro and micro elements, including phosphorus, magnesium, zinc, copper and manganese, in such predetermined mutual ratios that a predetermined supplemental feeding of the cattle is obtained when supplying the food supplement to the cattle, the improvement which comprises mixing water and substances which include first substances selected from the group consisting of oxides, hydroxides, phosphates and carbonates, and dissolving said substances in said water in combination with a predetermined amount of phosphoric acid to obtain a substantially saturated solution containing said macro and micro elements, which solution is capable of being dosed in drinking water of the cattle, in which method 280 to 350 moles of phosphates are incorporated per 100 kg food supplement and said first substances are used in such a predetermined amount that said saturated solution has a pH lower than pH3.5 to avoid phosphate precipitation.

5,160,754

DOUGH OF PIE, ETC. HAVING A SLIT ROLL CONFIGURATION

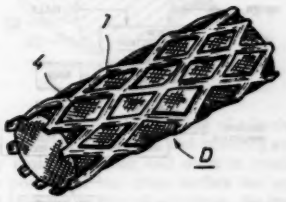
Toshihiro Hayashi; Satoru Takeda; Shyoichiro Yamazaki; Masayuki Sugie, and Norio Iwaki, all of Tokyo, Japan, assignors to Asahi Denka Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 5, 1991, Ser. No. 664,841

Claims priority, application Japan, Mar. 15, 1990, 2-26616[U]; Mar. 15, 1990, 2-26617[U]; Mar. 15, 1990, 2-26618[U]

Int. Cl.[5] A21D *10/02*

U.S. Cl. 426—94 **8 Claims**



1. A pastry dough in a roll surrounding an ingredient which is a moisture-abundant foodstuff, and a film of foodstuff in which said ingredient is enwrapped, said film of foodstuff being disposed between said ingredient and said pastry dough, the pastry dough but not the film of foodstuff having a plurality of slits over the entire surface of said pastry dough, said film of foodstuff being permeable to water vapor whereby upon cooking, said slits enlarge to form a mesh pattern, said film of foodstuff preventing leakage of said ingredient through said mesh pattern.

5,160,755

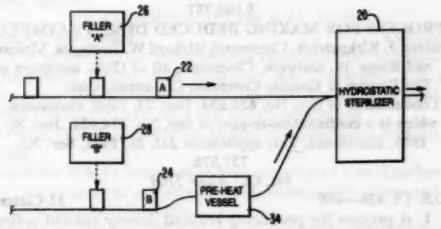
CANNED PRODUCT STERILIZING PROCESS

Michael S. Mignogna, Medford, and Steven Santana, Maple Shade, both of N.J., assignors to Campbell Soup Company, Camden, N.J.

Filed Jan. 26, 1990, Ser. No. 470,601

Int. Cl.[5] A23L *3/04*

U.S. Cl. 426—407 **56 Claims**



1. A packaged product sterilizing process, said process comprising the steps of:

preheating a plurality of first packages, each containing at least one thermally-treatable product, in a preheat vessel;

passing the preheated first packages through a hydrostatic sterilizer and thereby sterilizing the products in the first packages; and

passing a plurality of second packages, which are generally separate from the first packages and each of which contain at least one thermally-treatable product, having different initial sterilization processing requirements than those products of the first packages, through the hydrostatic sterilizer at the same processing time and temperature as

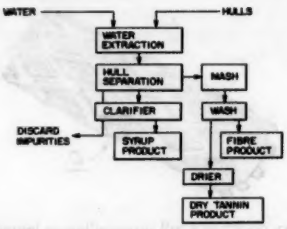
that of said passing the preheated first packages step, and thereby sterilizing the products in the second packages.

5,160,756

EXTRACTION OF PRODUCTS FROM ALMOND FRUIT

Israel N. Rabinowitz, Santa Barbara, Calif., assignor to ITD Corporation, Carpinteria, Calif.

Filed Mar. 24, 1987, Ser. No. 29,929
Int. Cl.[5] A23L *1/015*
U.S. Cl. 426—431 **3 Claims**



1. The process of extraction of products from almond hulls, comprising:

a. soaking almond hulls in warm water at a temperature between about 50 degrees Centigrade to about 70 degrees Centigrade to extract soluble substances therefrom, without exertion of substantial force on said hulls which would be disruptive of the parenchyma cells in the hulls, thereby to produce juice and hull residue, and separating said juice from said hull residue;

b. subjecting said hull residue while wet to substantial mechanical force disruptive of the parenchyma cells in the residue;

c. washing the product of step b with water at a pH between about 8.5 and about 9.0 to dissolve tannin therefrom; and

d. separating the fiber residue from the liquid resulting from step c thereby producing said fiber residue as a fiber which is substantially free from tannin, which is not digestible in the human digestive tract and which is tolerable by it due to the absence of substantial amounts of tannin.

5,160,757

PROCESS FOR MAKING REDUCED DENSITY COFFEE

Steven J. Kirkpatrick, Cincinnati; Richard W. Bertagna, Mason, and Roger W. Gutwein, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 633,634, Dec. 21, 1990, abandoned, which is a continuation-in-part of Ser. No. 374,424, Jun. 30, 1989, abandoned. This application Jul. 26, 1991, Ser. No. 737,576
Int. Cl.[5] A23F *5/04*
U.S. Cl. 426—466 **11 Claims**

1. A process for producing reduced density roasted coffee beans comprising the steps of:

(a) first, drying green coffee beans to a moisture content of from about 0.5% to about 7% by weight, wherein the drying is conducted at a temperature of from about 70° F. to about 325° F. for at least about 1 minute; then

(b) roasting the dried beans at a temperature of from about 350° F. to about 1200° F. for from about 10 seconds to not longer than about 5.5 minutes; and then

(c) cooling the roasted beans, wherein the resulting roast beans have:

(1) a Hunter L-color of from about 14 to about 25;

(2) a Hunger Δ L-color of less than about 1.2; and

(3) a whole roast tamped bulk density of from about (0.27 to about 0.38 g/cc.

5,160,758

PROCESS FOR THE PRODUCTION OF A PROTEIN GRANULE SUITABLE FOR USE AS A MEAT EXTENDER

Laura L. Parks, Ballwin, Mo., and Allen D. Greatting, Columbia, Ill., assignors to Protein Technologies International, Inc., St. Louis, Mo.

Filed May 31, 1991, Ser. No. 708,159
Int. Cl.[5] A23J *3/16*
U.S. Cl. 426—506 **6 Claims**

1. A process for producing a granulated protein product consisting essentially of:

a. hydrating a vegetable protein isolate with heated water at a ratio of about 2 to 3.5 parts by weight of water to about 1 part by weight of isolate wherein the water is at a temperature of about 50° C. to 100° C.; and

b. chopping said hydrated isolate in a bowl cutter under conditions of shear for about 1–3 minutes to form a gel, which gel is subdivided into firm, cohesive, hydrated protein granules suitable for use as a meat extender.

5,160,759

EDIBLE OIL-IN-WATER EMULSION

Masaki Nomura; Shin Koike, both of Ibaraki; Ko Yamashita, Chiba; Koichi Okisaka, Ibaraki; Yoshito Sano, Chiba; Hisao Omura, Ibaraki; Yuuichi Irinatsu, Ibaraki; Kenji Masui, Ibaraki, and Takeshi Yasumasu, Ibaraki, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Continuation of Ser. No. 532,755, Jun. 4, 1990, abandoned. This application Jan. 22, 1992, Ser. No. 824,866
Claims priority, application Japan, Jun. 7, 1989, 1-144351; Sep. 1, 1989, 1-226843; Sep. 1, 1989, 1-226844
Int. Cl.[5] A23D *7/00*
U.S. Cl. 426—602 **5 Claims**

1. An oil-in-water emulsion which comprises an aqueous phase of water and an oil phase comprising a glyceride mixture;

wherein said glyceride mixture comprises 30% by weight to 100% by weight of a diglyceride mixture, monoglycerides present in a weight ratio to said diglyceride mixture of 0 to 1/20, and the balance being triglycerides; said glyceride mixture having a melting point of 35 degree centigrade or below; and

wherein said oil phase comprises 10 to 99 percent by weight, based on the total weight of said oil phase, of a diglyceride mixture having an increasing melting point of 20 degree centigrade or less.

5,160,760

HEAT-RESISTANT CHOCOLATE AND A METHOD FOR PRODUCING IT

Toshio Takemori; Toshinobu Tsurumi, and Masahiro Takagi, all of Urawa, Japan, assignors to Lotte Company Limited, Tokyo, Japan

Filed Feb. 22, 1990, Ser. No. 482,970
Claims priority, application Japan, Apr. 15, 1989, 1-95970
Int. Cl.[5] A23C *3/00*
U.S. Cl. 426—660 **8 Claims**

7. A method for producing a heat-resistant chocolate, comprising mixing a water-in-oil emulsion with a temperature-tempered chocolate base material, said water-in-oil emulsion containing, prior to mixing with said chocolate base material, a water-soluble material dissolved in the aqueous phase of said water-in-oil emulsion, said water-soluble material being selected from the group consisting of saccharides and sugar alcohols; and cooling the mixture to form a solid having increased heat resistance; wherein the water-in-oil emulsion comprises oils and fats having an SFI not more than 20 at 20° C. and not more than 10 at 30° C.

5,160,761

METHOD FOR MAKING A MAGNETIC DISK

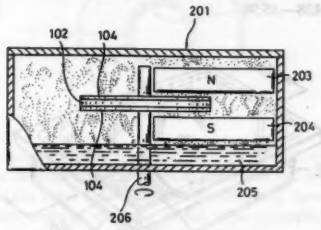
Keiji Koga; Jun-ichi Satoh, both of Saku; Kenji Yokoyama, Komoro; Akinori Nisizawa, and Yasumichi Tokuoka, both of Saku, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Division of Ser. No. 635,211, Dec. 28, 1990. This application Mar. 24, 1992, Ser. No. 856,703

Claims priority, application Japan, Dec. 29, 1989, 1-342990; Sep. 4, 1990, 2-233590

Int. Cl.[5] B05D *3/14*

U.S. Cl. 427—548 3 Claims



1. A method for preparing a magnetic disk comprising the steps of:

coating an annular rigid substrate with a magnetic coating composition containing magnetic submicron particles,

applying a magnetic field to the coated substrate in a solvent vapor while rotating the substrate, thereby leveling the coating, and

effecting orientation of the magnetic particles.

5,160,762

METHOD OF MANUFACTURING MONO-LAYER CAPACITORS

Hans-Wolfgang Brand, Aachen; Mareike K. Klee, Hückelhoven/Brachelen, both of Fed. Rep. of Germany; Johan W. C. De Vries, Eindhoven, Netherlands; Rainer M. Waser, Aachen, Fed. Rep. of Germany, and Robertus A. M. Wolters, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 29, 1991, Ser. No. 706,822

Claims priority, application Fed. Rep. of Germany, May 31, 1990, 4017518

Int. Cl.[5] B05D *5/12*

U.S. Cl. 427—79 11 Claims

1. A method of making a mono-layer capacitor having a fine-grained barium-titanate ferroelectric dielectric layer by providing said layer on a first noble metal electrode, which is supported on a substrate, and then providing a second noble metal electrode on the layer, said layer being provided on the first noble metal electrode by:

a. mixing a stable solution of barium and titanium salts of at least one compound selected from the group consisting of carbonic acids, alkoxides, acetyl acetonates, and mixtures thereof, and adjusting the solution such that, when a layer is formed by performing the following steps b and c, an excess quantity of titanium oxide of about 1 mol. % is obtained;

b. applying a coating of the solution;

c. thermally decomposing the coating at a temperature in the range of about 500° to 700° C.; and

d. repeating steps b and c until a desired layer thickness is obtained.

5,160,763

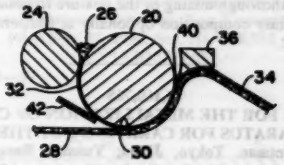
GLUE APPLICATOR APPARATUS AND METHOD

John D. Mims, Bradford, and Thomas M. Porat, Concord, both of N.H., assignors to Crathern Engineering Co., Inc., Contoocook, N.H.

Filed Aug. 29, 1991, Ser. No. 751,724

Int. Cl.[5] B05C *1/02, 1/12;* B05D *1/28*

U.S. Cl. 427—207.1 10 Claims



1. In apparatus for applying a coating of adhesive from an applicator drum to a moving sheet, and including a plurality of picks axially positioned along said drum in contact with a downstream portion of the drum surface for separating a coated sheet from the surface of said drum, the improvement comprising means positioned adjacent upstream portions of said drum surface for removing from said drum surface at least a major portion of said adhesive that lies in the path of each said pick.

9. In a method of coating a moving sheet with a liquid adhesive from an applicator drum and including the step of separating a coated sheet from the surface of said drum using a plurality of picks axially positioned along said drum in close adjacency to a downstream portion of the drum surface, the improvement comprising the step of removing from upstream portions of said drum surface at least a major portion of said adhesive that lies in the path of each said pick.

5,160,764

HOT MELT ADHESIVES HAVING IMPROVED POT LIVES AND PROCESSES FOR THEIR PREPARATION

Heinz Schmelzer, Ruemmelsheim, and Manfred Kuechler, Oberursel, both of Fed. Rep. of Germany, assignors to Hoechst AG, Fed. Rep. of Germany

Division of Ser. No. 641,496, Jan. 15, 1991, Pat. No. 5,120,789. This application Feb. 26, 1992, Ser. No. 841,821

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1990, 4001431

Int. Cl.[5] B05D *5/10;* C08F *8/42, 222/00*

U.S. Cl. 427—208.4 4 Claims

1. A process for the preparation of an adhesive thermoplastic composition having high cohesion, low flowability and a longer pot life and based on copolymers of ethylenically unsaturated monomers and chelating agents comprising

A) 90 to 99.99% by weight of at least one copolymer comprising

a) 20 to 95% by weight of at least one alkyl of 1 to 12 carbon atoms ester of α,β-ethylenically unsaturated mono- and/or dicarboxylic acids,

b) 0.1 to 20% by weight of at least one amide unsubstituted on the nitrogen of α,β-ethylenically unsaturated mono- and/or dicarboxylic acids,

c) 0.1 to 15% by weight of at least one α,β-ethylenically unsaturated mono- and/or dicarboxylic acid, and

d) 0 to 50% by weight of at least one other α,β-ethylenically unsaturated copolymerizable compound which is different from the monomers of a) to c), and

B) 0.01 to 10% by weight of at least one substance having a crosslinking action and being a metal compound of an alkyl acetoacetate of 1 to 6 carbon atoms in the alkyl or of a dihydric alcohol of 2 to 6 carbon atoms in which the metal atom is an element from group 2, 3 or 4 of the periodic table of the elements, the amounts of A)+B) and a) to d) each adding up to 100% by weight and optionally

C) further additives acting as extenders and other conventional additives which adhesive thermoplastic compositions additionally contain

D) an effective amount of an alkylphenolic resin or an arylphenolic resin as a crosslinking regulator comprising melting copolymer A) in a heatable mixer, dissolving cross-linking regulator D) in the melted copolymer A), adding cross-linking component B) and optionally component C to the melt in the heated mixer and dissolving or homogeneously dispersing with thorough mixing of the mixture to obtain the adhesive polymer composition optionally at temperatures of up to 120° C.

5,160,765

PROCESS FOR THE METALLIZATION OF CERAMICS AND APPARATUS FOR CARRYING OUT THE PROCESS

Frédéric Rotman, Tokyo, Japan; Yannick Rançon, Velizy, France; Philippe Queille, Viroflay, France, and Michel Olivier, Beynes, France, assignors to L'Air Liquide, Societe Anonyme Pour L'Etude Et L'Exploitation Des Procedes Georges Claude, Paris, France

Filed Feb. 22, 1990, Ser. No. 484,322

Claims priority, application France, Feb. 22, 1989, 89 02279

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—229 **14 Claims**

1. A process for metallizing ceramic articles which comprises the steps of:

a) depositing on a ceramic substrate a coating of a metallizing paste;

b) placing the coated substrate in an oven;

c) producing a treatment atmosphere comprising nitrogen, hydrogen and water vapor and which is substantially free of oxygen by

(i) providing a first mixture of nitrogen and hydrogen;

(ii) introducing oxygen into said first mixture for obtaining a second mixture; and

(iii) passing the second mixture through a catalytic reactor to cause the oxygen in the second mixture to catalytically react with the hydrogen,

said treatment atmosphere having a ratio of hydrogen content to water content of between 5:1 and 36:1;

d) supplying the oven with said treatment atmosphere; and

e) raising the temperature in the oven from the room temperature to a temperate between 1300° C. and 1600° C.

5,160,766

PROCESS FOR APPLYING A HIGH SOLID COATING COMPOSITION USING A HIGH PRESSURE AIRLESS SPRAY

Donald W. Waltrip, Shepherdsville, and Gordon Carter, Louisville, both of Ky., assignors to Akzo Coatings, Inc., Louisville, Ky.

Filed Jun. 27, 1991, Ser. No. 722,260

Int. Cl.[5] B05D *1/02, 3/02*

U.S. Cl. 427—384 **14 Claims**

1. A method for applying a high quality leveling finish coat to a substrate which comprises:

(a) forming a coating in a liquid, organic solvent wherein said coating has a solids content, in excess of about 35 percent non-volatile by weight;

(b) without further addition of solvents, introducing the coating into a reservoir of a high pressure airless spray unit having a compression ratio of at least about 30 to 1 and providing a minimum fluid pressure in the range of at least about 2,750 psi, said airless spray unit being provided with a pump and a means for controlling the temperature of the coating within the range of about 65° F. to 120° F. wherein the viscosity of the coating is maintained in the range of about 250 to 1,000 cps at the operating temperature range of the pump;

(c) without further addition of solvents, applying the coating to the substrate to be coated; and

(d) removing substantially all of the solvent from the coating.

5,160,767

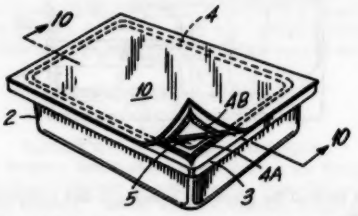
PEELABLE PACKAGING AND SHEET MATERIALS AND COMPOSITIONS FOR USE THEREIN

Roger P. Genske, Neenah, and Frank Bauer, Appleton, both of Wis., assignors to American National Can Company, Chicago, Ill.

Continuation of Ser. No. 206,077, Jun. 13, 1988, abandoned, which is a division of Ser. No. 45,003, Apr. 30, 1987, Pat. No. 4,937,139. This application Oct. 4, 1990, Ser. No. 595,694

Int. Cl.[5] B29D *22/00*

U.S. Cl. 428—35.98 **25 Claims**



1. A closed and sealed package comprising a receptacle having a sealing surface for sealing a closure thereto, and a closure sealed to said sealing surface said closure comprising:

a. a substrate selected from the group consisting essentially of metal foils, vinyl alcohol copolymers, vinylidene chloride copolymers and olefinic polymers having a surface; and

b. a first layer on said surface of said substrate, said first layer consisting essentially of a blend of polypropylene and an ethylene polymer having a density of at least 0.940; said first layer of said closure being sealed to said sealing surface of said receptacle such that when said closure is peeled away from said sealing surface a tearing occurs in said first layer at the seal area to provide access to the interior of said receptacle.

5,160,768

CURABLE SILICONE-COATED MICROPOROUS FILMS FOR CONTROLLED ATMOSPHERE PACKAGING

Mitchell K. Antoon, Jr., Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Oct. 25, 1988, Ser. No. 262,764

Int. Cl.[5] B65B *25/04;* **B65D** *85/34*

U.S. Cl. 428—35.2 **5 Claims**

1. A container capable of creating within it a preselected carbon dioxide and oxygen concentration in the presence of respiring fresh fruit, vegetables or flowers, that is constructed of a substantially gas-impermeable material having a gas-permeable panel in one or more of its walls to provide a controlled flow or flux of CO_2 and O_2 through its walls, where the panel is a microporous plastic membrane that is a laminate of a uniaxially or biaxially oriented film comprised of a polyolefin, filled with 40 to 75 % of calcium carbonate, based on the total weight of the film, coated with a cured silicone elastomer, which membrane has an oxygen permeance between about 77,500 and 15,500,000 cc/m^2-day-atmosphere and a CO_2 to O_2 permeance ratio of from about 3 to 6, the permeance and area of the membrane being such as to provide a flux of O_2 approximately equal to the predicted O_2 respiration rate at steady-state for not more than 3.0 kg of the enclosed fruit, vegetable or flower, and the carbon dioxide permeance of the membrane being such as to maintain the desired optimum ranges of carbon dioxide and oxygen for not more than the said 3.0 kg of enclosed produce.

5,160,769

THERMAL INSULATION: CO_2 FILLED FOAM

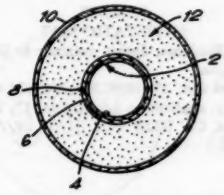
Michael E. Garrett, Woking, England, assignor to The BOC Group plc, Windlesham, England

Filed Aug. 2, 1990, Ser. No. 561,838

Claims priority, application United Kingdom, Aug. 9, 1989, 8918218

Int. Cl.[5] F16L 59/14; B65D 88/00

U.S. Cl. 428—36.5 8 Claims



1. Thermally-insulated apparatus including a wall one side of which is in contact with a medium at a temperature of less than 77° K. and the other side of which has adhering thereto polymer foamed material defining closed cells containing a substance which is gaseous at normal ambient temperatures and solid at temperatures of 77° K. and less, wherein said solid creates a partial vacuum therein, said foamed material facing a space between a foam side of the wall and an outer sleeve, which space contains thermal insulation and a nitrogen atmosphere.

5,160,770

CARPET PADS HAVING PRESSURE SENSITIVE ADHESIVE

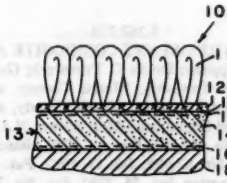
Merle R. Hoopengardner, Lafayette, Calif., assignor to Step Loc Corporation, Lafayette, Calif.

Continuation-in-part of Ser. No. 147,214, Jan. 22, 1988, abandoned, which is a continuation of Ser. No. 882,173, Jul. 7, 1986, Pat. No. 4,797,170. This application Sep. 13, 1988, Ser. No. 243,606

The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.

Int. Cl.[5] A61F 13/02

U.S. Cl. 428—40 9 Claims



1. A carpet pad for installation between a floor and a wall-to-wall carpet, for retaining the carpet and pad in place by adhesion without need for stretching, comprising:

a pad with upper and lower surfaces and of such thickness, density and compressibility as to enable it to serve as a carpet padding;

the pad being of generally conventional width and length for a carpet pad, wide enough and long enough to allow its use for installation of wall-to-wall carpet in a practical manner;

means for sealing both surfaces of the pad; and

pressure-sensitive adhesive means on only one surface of the pad, for adhering and bonding said one surface of the pad to a surface of a floor or to the underside of a carpet, for holding the carpet and pad in position without stretching while allowing for temporary lifting of the carpet wholly or in localized areas when desired,

the adhesive means being placed over the sealing means.

5,160,771

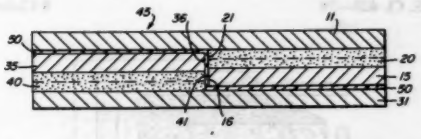
JOINING METAL-POLYMER-METAL LAMINATE SECTIONS

Cynthia L. T. Lambing, Kiskiminetas; James A. Colpo, and William C. Herbein, both of Murrysville, all of Pa., assignors to Structural Laminates Company, New Kensington, Pa.

Filed Sep. 27, 1990, Ser. No. 588,752

Int. Cl.[5] B32B 3/00

U.S. Cl. 428—57 17 Claims



1. A metal-polymer-metal laminate (45) made by adhesively joining adjacent laminate sections, said laminate (45) comprising:

(a) a first laminate section (10) comprising:

(i) a first metal layer (11);

(ii) a second metal layer (15) having a lateral end (16), said second metal layer (15) being laterally non-coextensive with the first metal layer (11); and

(iii) a fiber-reinforced first polymer layer (20) between said first metal layer (10) and second metal layer (15), said first polymer layer (20) having a lateral end (21); (b) a second laminate section (30) comprising:

(i) a first metal layer (31) opposed to a metal layer (15);

(ii) a second metal layer (35) having a lateral end (36) opposed to the lateral end (21) of a polymer layer (20), said second metal layer (35) being laterally non-coextensive with the first metal layer (31); and

(iii) a fiber-reinforced first polymer layer (40) between said first metal layer (31) and second metal layer (35), said first polymer layer (40) having a lateral end (41) opposed to the lateral end (16) of a metal layer (15) in the first laminate section (10); and

(c) an adhesive layer (50) interposed between said first and second laminate sections (10, 30) and adhesively joining them together.

5,160,772

COMPOSITE MOLDED ARTICLES

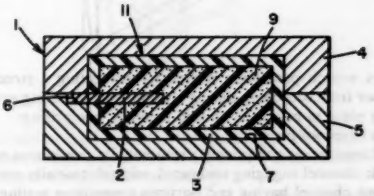
Takashi Futami, Zushi; Tatsuhiko Iwamoto, Tokyo, and Seijiro Okamura, Hokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Apr. 23, 1991, Ser. No. 690,038

Claims priority, application Japan, Apr. 23, 1990, 2-107268; Apr. 23, 1990, 2-107269; May 17, 1990, 2-125491

Int. Cl.[5] B32B 1/04

U.S. Cl. 428—71 17 Claims



1. An integrally molded composite comprising a core mem-

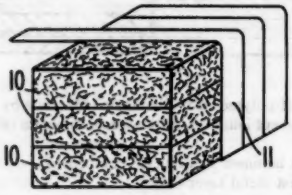
ber and a polynorbornene outer layer, said core member comprising a low foaming ratio plastic foam having an integrally formed skin on substantially the surface thereof, said core member being encapsulated by said outer polynorbornene layer and said outer polynorbornene layer comprising at least one norbornene-type monomer that is bulk polymerized via metathesis ring-opening bulk polymerization around said core member.

5,160,773

ENCAPSULATED FELT

Robert L. Sassa, Newark, Del., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Aug. 16, 1991, Ser. No. 746,681
Int. Cl.[5] B32B *1/04, 3/26;* D04H *1/08*
U.S. Cl. 428—76 **9 Claims**



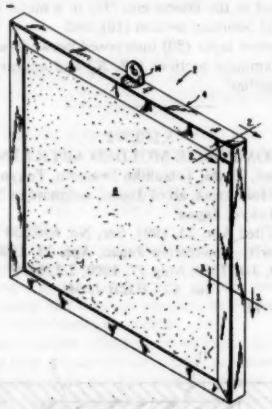
1. A sealing material of polytetrafluoroethylene felt encapsulated in a tape of polytetrafluoroethylene having a layer of thermoplastic fluorinated polymer on one side of said tape, said tape having the thermoplastic fluorinated polymer adjacent the felt.

5,160,774

SCORCH PREVENTION DEVICE

Robert L. Pitts, 1850 State Rte. 12, Fremont, Ohio 43420

Filed Dec. 31, 1990, Ser. No. 636,274
Int. Cl.[5] B32B *3/06, 1/04*
U.S. Cl. 428—83 **2 Claims**



1. A scorch protection device for protecting a structural member from scorching during a welding or soldering process taking place in proximity to said member, comprising:

a) a fireproof panel;

b) frame means comprising a substantially continuous metallic channel engaging said panel, said substantially continuous channel having end portions comprising mating protrusions and valleys for permitting said end portions to snap together and for securing said frame in holding relationship to said panel; and

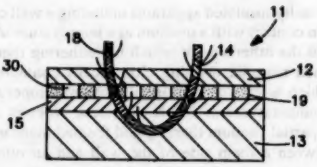
c) means structurally connected to said panel for hanging said panel adjacent said structural member.

5,160,775

ANTISTATIC MAT

Kohei Yamada, Hashima, Japan, assignor to Daiwa Company, Ltd., Gifu, Japan

Filed Dec. 27, 1990, Ser. No. 634,420
Claims priority, application Japan, Jun. 17, 1990, 2-158276
Int. Cl.[5] B32B *3/02, 33/00, 27/14*
U.S. Cl. 428—95 **5 Claims**



1. An antistatic mat comprising:

a base fabric,

a discharging paper comprising conductive and synthetic fibers, wherein said conductive fibers partly protrude from the surface, which is partially adhered to said base fabric creating space between said discharging paper and said base fabric;

a backing layer formed at a side of the discharging paper opposite the base fabric, and;

pile including conductive fibers driven through said base fabric, said discharging paper and said backing layer.

5,160,776

BALLISTIC-RESISTANT COMPOSITE ARTICLE

Hsin L. Li, Parsippany; Dusan C. Prevorsek; Gary A. Harpell, both of Morris Township, Morris County, and Young D. Kwon, Mendham Township, Morris County, all of N.J., assignors to Allied-Signal Inc., Morristown, N.J.

Division of Ser. No. 452,076, Dec. 18, 1989, abandoned, which is a division of Ser. No. 62,998, Jul. 13, 1987, Pat. No. 4,916,000. This application Jun. 24, 1991, Ser. No. 719,404
Int. Cl.[5] B32B *5/12*
U.S. Cl. 428—109 **36 Claims**

1. An impact resistance composite comprised of one or more layers at least one of said layers comprising a network of filaments selected from the group consisting of polyamide filaments and polyester filaments in a matrix material, wherein the ratio of the thickness of said layer to the equivalent diameter of said filaments is equal to or less than about 12.8.

5,160,777

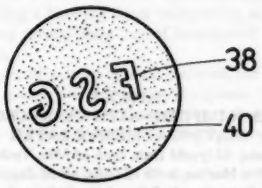
CHILL ROLL PRINTING

Antony I. Woodward, Pulaski, and Stephen M. Simpson, Clay, both of N.Y., assignors to Felix Schoeller jr GmbH & Co. KG, Osnabrück, Fed. Rep. of Germany

Division of Ser. No. 315,444, Feb. 24, 1989, Pat. No. 4,987,014. This application Jan. 15, 1991, Ser. No. 641,473

Int. Cl.[5] B32B *3/00, 23/08, 27/10;* G03C *1/79*

U.S. Cl. 428—172 15 Claims



1. An imaging base paper, comprising

a center raw-base cellulose paper;

a front layer of polyolefin laminated to the front side of the center raw-base cellulose paper;

a rear layer of polyolefin laminated to the rear side of the center raw-base cellulose paper having areas of a higher gloss level in first regions of the rear side of the imaging base paper and having areas of a lower gloss level in second regions of the rear side of the imaging base paper surrounding the first regions,

wherein the gloss difference between the first regions and the second regions on the coated paper amounts to from about 20 to 80, as measured with a measuring head under an angle of 60 degrees, according to standard ASTM D 523.

5,160,778

TRANSFER SHEET FOR MARKING

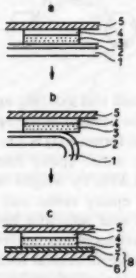
Sadaaki Hashimoto, Chofu, and Takeshi Tomiyama, Hiratsuka, both of Japan, assignors to Kansai Paint Company, Limited, Amagasaki, Japan

Filed Dec. 15, 1989, Ser. No. 451,820

Claims priority, application Japan, Dec. 21, 1988, 63-322450

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—195 4 Claims



1. A transfer sheet for marking which comprises: a release sheet, a layer of pressure-sensitive adhesive on said release sheet, a printed layer adjacent said layer of pressure-sensitive adhesive, and an application film consisting of a second adhesive layer adjacent said printed layer and a film layer adjacent said second adhesive layer, wherein said film layer is composed of material selected from the group consisting essentially of: fibers including paper, Japanese paper, unwoven fabric, and woven fabric, and plastics including polyvinyl chloride, polyester, polyethylene, polyvinyl chloride/polyvinyl acetate, polyethylene/polybutylene, polyethylene/polyvinyl acetate, polyethylene/alkyl polyacrylate, cellulose acetate, and cellophane.

5,160,779

MICROPROBE PROVIDED CIRCUIT SUBSTRATE AND METHOD FOR PRODUCING THE SAME

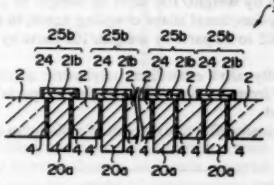
Osamu Sugihara, Nagasaka, Japan, assignor to Hoya Corporation, Japan

Filed Nov. 29, 1990, Ser. No. 620,861

Claims priority, application Japan, Nov. 30, 1989, 1-311887; Mar. 30, 1990, 2-83832; Mar. 30, 1990, 2-83833; Aug. 31, 1990, 2-231697

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—209 18 Claims



1. A microprobe-provided circuit substrate comprising:

a base made of an inorganic electrically-insulating material or a semiconductive material and having a plurality of fine through holes;

microprobes constituted by pillar-shaped conductors correspondingly respectively provided in said fine through holes, each of said microprobes having one end that projects beyond one surface of said base, said one end being brought into contact with a circuit to be tested; and

conductive portions provided on the other surface of said base electrically connected to the other end of corresponding microprobes.

5,160,780

STRUCTURE FOR INSTALLING MIRROR BASE ON GLASS PLATE AND METHOD FOR INSTALLING MIRROR BASE ON GLASS PLATE

Michio Ono; Masaharu Kume, both of Yokohama, and Takayuki Matsuo, Aikawa, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

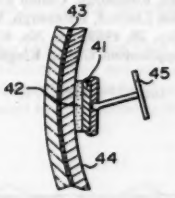
PCT No. PCT/JP88/01320, § 371 Date Sep. 19, 1989, § 102(e) Date Sep. 19, 1989, PCT Pub. No. WO89/05782, PCT Pub. Date Jun. 29, 1989

PCT Filed Dec. 23, 1988, Ser. No. 434,673

Claims priority, application Japan, Dec. 24, 1987, 62-325182; Sep. 2, 1988, 63-220205; Oct. 4, 1988, 63-129555[U]

Int. Cl.[5] C08G *77/06, 77/04*

U.S. Cl. 428—220 11 Claims



1. An adhesive composition for installing a mirror base on a glass plate comprising a film or sheet of a cross-linkable silicone rubber composition comprising:

(A) an organopolysiloxane having at least two alkenyl groups bonded to silicon atoms per molecule;

(B) an organohydrogenpolysiloxane having at least two hydrogen atoms bonded to silicon atoms per molecule, in an amount to provide a molar ratio of hydrogen atoms bonded to silicon atoms in (B)/alkenyl groups bonded to silicon atoms in (A) in the range of from 0.5/1 to 5/1;

(C) wet process hydrophobic reinforcing silica having a specific surface area of at least 200 m^2/g, said silica comprising SiO_2 units and organosiloxane units selected from the group consisting of $R_3SiO_{\frac{1}{2}}$ units, R_2SiO units, $RSiO_{3/2}$ units and a mixture thereof, wherein each R is a substituted or non-substituted monovalent hydrocarbonyl group, said silica having a molar ratio of organosiloxane units/SiO_2 units of from 0.08 to 2.0, said silica being present in an amount of 30 to 150 parts by weight/100 parts by weight of (A);

(D) an acryl-functional silane coupling agent or a methacryl-functional silane coupling agent, in an amount of from 0.05 to 10 parts by weight/100 parts by weight of (A);

(E) an epoxy-functional silane coupling agent, in an amount of from 0.05 to 10 parts by weight/100 parts by weight of (A);

(F) a partially allyl etherified polyhydric alcohol, in an amount of from 0 to 5 parts by weight/100 parts by weight of (A); and

(G) a catalytically effective amount of a platinum compound catalyst.

5,160,781

POLYIMIDE COMPOSITION AND PREPREG AND LAMINATE THEREOF

Shingo Yoshioka; Kenzi Ogasawara; Yoshihide Sawa, and Tokio Yoshimitsu, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Mar. 21, 1990, Ser. No. 496,634

Claims priority, application Japan, Apr. 25, 1989, 1-105268; May 12, 1989, 1-119153; Dec. 22, 1989, 1-333456

Int. Cl.[5] B32B *15/08*

U.S. Cl. 428—224 **8 Claims**

1. A prepreg for use in multilayered printed-wiring boards, comprising:

a base material impregnated with a polyimide composition which is half-set, said polyimide composition comprising 100 parts by weight of polyimide, 10 to 200 parts by weight of a triallyl isocyanurate composition, and a diluting solvent;

wherein said polyimide is prepared through reaction to unsaturated bisimide and diamine, more than wt.% of the polyimide comprising alkyl, alkylene exclusive of methylene, or a mixture thereof; and

wherein said triallyl isocyanurate composition comprises up to 100 parts by weight of at least one non-polymeric triallyl isocyanurate to 1 part by weight of triallyl isocyanurate polymer having a weight-average molecular weight in the range of 500 to 10,000.

5,160,782

WIRED GLASS

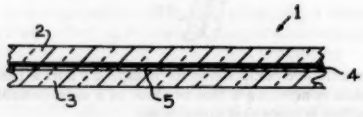
James A. A. Hickman, Edinburgh, United Kingdom, assignor to Miller Construction Limited, Edinburgh, United Kingdom

Filed Sep. 28, 1989, Ser. No. 415,042

Claims priority, application United Kingdom, Sep. 28, 1988, 8822780

Int. Cl.[5] B32B *17/10*

U.S. Cl. 428—245 **9 Claims**



1. A wired glass incorporating a wire mesh, characterised in that the wires of the mesh comprise a metallic core and a decorative coating of paint colored differently from the core; and in that the wire mesh is embedded in an interlayer of adhesive binder material which bonds together two spaced apart glazing panels.

5,160,783

EPOXY RESIN-IMPREGNATED GLASS CLOTH SHEET HAVING ADHESIVE LAYER

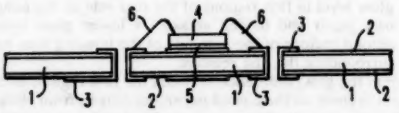
Yousui Nemoto; Akiyoshi Itoh, both of Mie; Toshimi Kohmura, and Yasuhiro Horiba, both of Gifu, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1990, Ser. No. 630,240

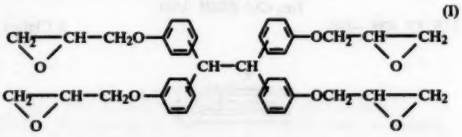
Claims priority, application Japan, Dec. 19, 1989, 1-327106

Int. Cl.[5] C09J *7/04*

U.S. Cl. 428—261 **12 Claims**



1. An epoxy resin-impregnated glass cloth sheet having an adhesive layer provided on at least one side of the surface thereof, comprising (A) said epoxy resin-impregnated glass cloth sheet is formed by impregnating glass cloth with a curable epoxy resin composition and curing it to its final curing stage, said curable epoxy resin composition comprising an epoxy resin represented by the following structural formula (I),



a brominated epoxy resin and a curing agent for epoxy resin in such an amount that the content of the epoxy resin represented by the above structural formula (I) is 5 to 50% by weight based on the amount of the entire epoxy reins and the content of bromine atom is 14 to 30% by weight based on the combined amount of the entire epoxy resins and the curing agent for epoxy resin; and (B) said adhesive layer is composed of a curable epoxy resin composition comprising an epoxy resin represented by the above structural formula (I), a brominated epoxy resin, an acrylonitrile/butadiene copolymer having carboxyl groups in its molecule which is a solid at room temperature, and a curing agent for epoxy resin in such an amount that the content of the epoxy resin represented by the above structural formula (I) is 5 to 70% by weight based on the amount of the entire epoxy resins, the content of the acrylonitrile/butadiene copolymer is 20 to 70 parts by weight based on 100 parts by weight of the entire epoxy resins and the content of bromine atom is 10 to 30% by weight based on the combined amount of the entire epoxy resins, the acrylonitrile/butadiene copolymer and the curing agent for epoxy resin.

5,160,784

FIRE-RESISTANT THERMOPLASTIC COMPOSITE STRUCTURE

Creston D. Shmidt, Nashport, and William G. Stobby, Johnstown, both of Ohio, assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 28, 1991, Ser. No. 724,570
Int. Cl.[5] B32B *3/26*
U.S. Cl. 428—316.6 10 Claims

1. A coextruded, fire-resistant, thermoplastic composite structure, comprising:

a first layer of a foam of a thermoplastic material, the first layer having a blowing agent comprising water, the first layer being substantially free of brominated aliphatic fire retardants;

a second layer of a thermoplastic material, the second layer having a quantity of a brominated aliphatic fire retardant sufficient to reduce the flammability of the composite structure, the first and second layers being adjacent each other.

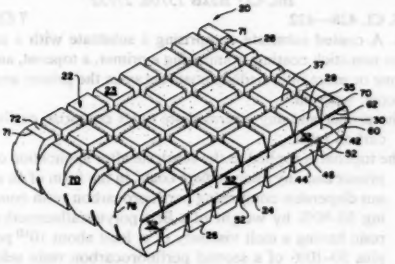
2. The structure of claim 1, wherein the structure has a plurality of substantially alternating first and second layers.

5,160,785

PADDING BODY

Paul R. Davidson, Jr., Richmond, Va., assignor to E. R. Carpenter Company, Inc., Richmond, Va.

Continuation-in-part of Ser. No. 713,336, Jun. 11, 1991. This application Jul. 9, 1991, Ser. No. 727,844
Int. Cl.[5] B32B *3/26;* A47C *27/00, 27/14*
U.S. Cl. 428—316.6 23 Claims



1. A padding body, comprising:

a compressible base member having an upper and a lower surface;

compressible upper protuberances extending off of the upper surface of said base member, said upper protuberances being separated from one another by upper recesses which extend to said base member;

compressible bottom protuberances extending off of the lower surface of said base member, said bottom protuberances being separated from one another by bottom recesses;

said base member having slits formed therein which open into the upper recess and which extend below the upper recesses into said base member, said slits extending into said base member such that said base member includes a continuous band of material between an end of said slits and the lower surface of said base member.

5,160,786

RESIN MATERIAL FOR INSERTING LEAD FRAME AND MOLDED COMPONENT THEREOF

Mikio Nakai, Shizuoka, Japan, assignor to Polyplastics Co. Ltd., Osaka, Japan

Filed Dec. 19, 1990, Ser. No. 630,197
Claims priority, application Japan, Dec. 27, 1989, 1-344686
Int. Cl.[5] B32B *5/16, 15/08*
U.S. Cl. 428—323 9 Claims

1. A molded component comprising a resin material and a lead frame inserted therein, said resin material comprising:

(A) 100 parts by weight of a polyarylene sulfide resin,

(B) 0.1 to 30 parts by weight of an α-olefin copolymer graft-copolymerized with an unsaturated carboxylic acid or its anhydride, and

(C) 10 to 300 parts by weight of a fibrous filler, a nonfibrous inorganic filler or a mixture thereof.

4. The molded component of claims 1, 3 or 3, wherein component (C) comprises a mixture of at least one powdery filler selected from the group consisting of mica, talc, glass flake and glass beads with a glass fiber.

5,160,787

ELECTRICAL LAMINATE HAVING ABILITY TO ABSORB ULTRAVIOLET RAYS

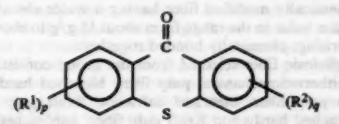
Morio Gaku; Kenzi Ishii, and Takamasa Nakai, all of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 463,199, Jan. 10, 1990, abandoned. This application Sep. 5, 1991, Ser. No. 754,997
Claims priority, application Japan, Jan. 12, 1989, 1-3647; Jan. 27, 1989, 1-16401; Feb. 28, 1989, 1-45434
Int. Cl.[5] B32B *15/08*
U.S. Cl. 428—333 6 Claims

1. An electrical laminate which comprises (i) at least one thermosetting resin-impregnated substrate, (ii) a combination of said substrate and a metal foil, or (iii) a combination of said substrate, a metal foil and an adhesive layer for the metal foil comprising a thermosetting resin, wherein

said thermosetting resin of at least one said substrate or said adhesive layer contains 0.2 to 6.0% by weight of a light absorber (A) on the bases of the weight of the thermosetting resin,

said light absorber (A) is selected from the group consisting of (a) an alkylthioxantone and said alkylthioxantone (a) and (b) an ultraviolet rays-absorber, said alkylthioxantones represented by the following formula (1):



(I)

wherein each of R^1 and R^2 represents alkyl group, each of

p and q represents 0 or an integer of not more than 4, and $p+q \geq 1$,

and the electrical laminate having an ability to absorb or shield ultraviolet rays having wavelength of 300–420 nm.

5,160,788

LAMINATES WITH ADHESIVE LAYERS OF FIRE RETARDANT, MELT STABLE ETHYLENE/CARBOXYLIC ACID COPOLYMER COMPOSITIONS

Stewart C. Feinberg, Exton, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 654,132, Feb. 11, 1991, Pat. No. 5,118,746. This application Mar. 31, 1992, Ser. No. 860,845

Int. Cl.[5] B32B *7/12, 27/18, 27/30;* **E04B** *101/00*

U.S. Cl. 428—344 **17 Claims**

1. A laminated structure comprising at least one non-adhesive layer and at least one adhesive layer, in which the adhesive layer is made of a composition comprising a blend of

(i) a matrix polymer E/X/Y, where E is ethylene; X is a C_3–C_7 alpha, beta-unsaturated carboxylic acids; and Y selected from the group consisting of C_1–C_{10} alkyl esters of C_3–C_7 alpha, beta-unsaturated carboxylic acids, vinyl esters, vinyl ethers, acrylonitrile, methacrylonitrile, carbon monoxide, and sulfur dioxide; the respective relative weight ratios of the monomers in said E/X/Y copolymer being about 96:40:0 to 40:30:30, and the melt index of said copolymer being about 0.1–100 dg/min;

(ii) a stabilizing polymer of ethylene with an unsaturated carboxylic acid selected from the group consisting of acrylic acid and methacrylic acid having a melt index of at least about 5,000 dg/min, and containing at least about 5 weight percent of carboxylic acid monomer; and

(iii) an antimony oxide/organo halogen fire retardant composition, the relative weight ratio of matrix polymer to stabilizing polymer being about 98:2 to 65:45, the amount of antimony oxide in the blend being about 2 to 20 weight percent, and the amount of organo-halogen compound in the blend being from about 7 to 55 weight percent.

5,160,789

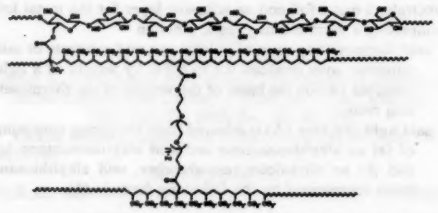
FIBERS AND PULPS FOR PAPERMAKING BASED ON CHEMICAL COMBINATION OF POLY(ACRYLATE-CO-ITACONATE), POLYOL AND CELLULOSIC FIBER

Robert L. Barcus, Springfield Twp., and David W. Bjorkquist, Wyoming, both of Ohio, assignors to The Procter & Gamble Co., Cincinnati, Ohio

Filed Dec. 28, 1989, Ser. No. 458,265

Int. Cl.[5] D02G *3/00*

U.S. Cl. 428—361 **14 Claims**



1. A chemically modified fiber having a water absorbency and retention value in the range from about 15 g/g to about 130 g/g comprising, chemically bonded together:

(a) a cellulosic fiber selected from the group consisting of chemithermomechanical pulp fiber, bleached hardwood Kraft pulp fiber, bleached softwood Kraft pulp fiber, unbleached hardwood Kraft pulp fiber, unbleached softwood Kraft pulp fiber, bleached softwood sulfite pulp fiber, unbleached softwood sulfite pulp fiber, cotton linters, mercerized dissolving pulp fiber, unmercerized dissolving pulp fiber, and mixtures thereof;

(b) a poly(acrylate-co-itaconate) having a weight average molecular weight in the range from about 60,000 to about 1,000,000, an acrylate content of from about 50 mole % to about 99 mole % and an itaconate content of from about 1 mole % to about 50 mole %, and

(c) a polyol;

wherein the proportion by weight of said poly(acrylate-co-itaconate) to polyol is from about 250:1 to about 3:1 and the weight of said poly(acrylate-co-itaconate) plus said polyol per unit weight of said cellulosic fiber, (a), is in the range from about 0.3 to about 2, the poly(acrylate-co-itaconate) weight being expressed on an acid equivalent basis.

5,160,790

LUBRICIOUS HYDROGEL COATINGS

Richard K. Elton, Glens Falls, N.Y., assignor to C. R. Bard, Inc., Glens Falls, N.Y.

Filed Nov. 1, 1990, Ser. No. 607,550

Int. Cl.[5] B32B *27/34, 27/36, 27/40*

U.S. Cl. 428—412 **16 Claims**

1. An article comprising a substrate on which is coated a hydrophilic, lubricious, organic coating comprising a crosslinked polyurethane and a polyvinylpyrrolidone, said crosslinked polyurethane formed from the reaction of an isocyanate and a polyol, said isocyanate containing at least two NCO groups per molecule and the polyol having at least two hydroxy groups per molecule, the sum of the average NCO functionality and the average hydroxy functionality exceeding 4.

5,160,791

NON-STICK COATING SYSTEM WITH TWO PERFLUOROCARBON RESINS IN TOPCOAT FOR CONCENTRATION GRADIENT

Harvey P. Tannenbaum, Philadelphia, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 12, 1990, Ser. No. 626,500

Int. Cl.[5] B32B *15/08, 27/32*

U.S. Cl. 428—422 **7 Claims**

1. A coated substrate comprising a substrate with a multilayer non-stick coating, comprising a primer, a topcoat, and up to one or more intermediate coats between the primer and the topcoat, wherein:

the primer and any intermediate coats comprise perfluorocarbon resin,

the topcoat is applied to the substrate after application of the primer and any intermediate coats, in the form of an aqueous dispersion comprising perfluorocarbon resin comprising 50–90% by weight of a first polytetrafluoroethylene resin having a melt viscosity of at least about 10^{10} poises, plus 50–10% of a second perfluorocarbon resin selected from polytetrafluoroethylene and a perfluorinated copolymer of hexafluoropropylene and tetrafluoroethylene having a melt viscosity in the range of 10^3 to 10^8 poises.

5. The coated substrate of claim 1 wherein the substrate is metal selected from aluminum, stainless steel and carbon steel.

5,160,792

THERMOSETTING POWDER COATING COMPOSITIONS

Robert B. Barbee, and Brian S. Phillips, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 4, 1991, Ser. No. 650,272

Int. Cl.[5] B32B *27/36;* **C08F** *20/00*

U.S. Cl. 428—480 **12 Claims**

1. A thermosetting powder coating composition which comprises an intimate blend comprising

(1) a blend of polymers having free hydroxy groups comprised of

(a) about 10 to 70 weight percent of an amorphous polyester having a glass transition temperature (Tg) of greater than 40° C., a hydroxyl number of about 20 to 200 and an inherent viscosity of about 0.1 to 0.5; said amorphous polyester comprised of diol and dicarboxylic acid residues, said diol residues selected from a group consisting of residues of ethylene glycol, propylene glycol, 1,3-propanediol, 2,4-dimethyl-2-ethylhexane-1,3-diol, 2,2-dimethyl-1,3-propanediol, 2-ethyl-2-butyl-1,3-propanediol, 2-ethyl-2-isobutyl-1,3-propanediol, 1,3-butanediol, 1,3-butanediol, 1,5-pentanediol, thiodiethanol, 1,2-cyclohexanedimethanol, 1,3-cyclohexanedimethanol, 1,4-cyclohexanedimethanol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, and 1,4-xylylenediol; and

(b) about 90 to 30 weight percent of an amorphous polyester having a Tg of at least 50° C., a hydroxyl number of about 20 to 200, and an inherent viscosity of about 0.1 to 0.5 which comprises

(i) diacid residues comprising at least 50 mole percent terephthalic acid residues; and

(ii) diol residues comprising at least 90 mole percent of 2,2-dimethyl-1,3-propanediol and 1,4-bis(2-hydroxyethoxy)benzene residues wherein the mole ratio of 2,2-dimethyl-1,3-propanediol residues to 1,4-bis(2-hydroxyethoxy)benzene residues is about 4:1 to 0.7:1; or

(iii) diol residues comprising at least 90 mole percent of 2,2-dimethyl-1,2-propanediol and 1,3-bis(2-hydroxyethoxy)benzene residues wherein the mole ratio of 2,2-dimethyl-1,3-propanediol residues to 1,3-bis(2-hydroxyethoxy)benzene residues is about 4:1 to 0.7:1; or a mixture of (ii) and (iii); and

(2) a cross-linking effective amount of a cross-linking agent.

5,160,793

SHALLOW OHMIC CONTACTS TO N-$AL_XGA_{1-X}AS$

Longru Zheng, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 7, 1991, Ser. No. 711,830

Int. Cl.[5] H01L *29/12*

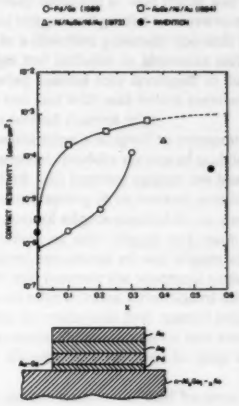
U.S. Cl. 428—620 **3 Claims**

1. A shallow ohmic contact to n-type $Al_xGa_{1-x}As$, where x is greater than 0.3, consisting essentially of:

(a) the n-type carrier concentration being in a range of 10^{17} cm^{-3} to 10^{18} cm^{-3};

(b) a layer which has dispersed interfacial oxides between the $Al_xGa_{1-x}As$ substrate and the Pd layer of Pd formed on the surface of the $Al_xGa_{1-x}As$ layer;

(c) a layer of gold germanium formed on the Pd layer;



(d) a layer of silver formed on the gold germanium layer; and

(e) a layer of gold formed on the silver layer.

5,160,794

SUPERCONDUCTOR AND PROCESS OF MANUFACTURE

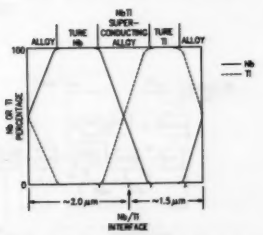
James Wong, Wayland; Mark K. Rudziak, Westminister, and Donald W. Capone, II., Northbridge, all of Mass., assignors to Composite Materials Technology, Inc., Shrewsbury, Mass.

Continuation-in-part of Ser. No. 480,236, Feb. 15, 1990, which is a continuation-in-part of Ser. No. 363,634, Jun. 8, 1989, Pat. No. 4,925,741. This application Jun. 19, 1990, Ser. No. 540,193

The portion of the term of this patent subsequent to Oct. 27, 2009, has been disclaimed.

Int. Cl.[5] C22C *1/18;* H01L *39/12, 39/24;* H01B *12/02*

U.S. Cl. 428—661 **18 Claims**



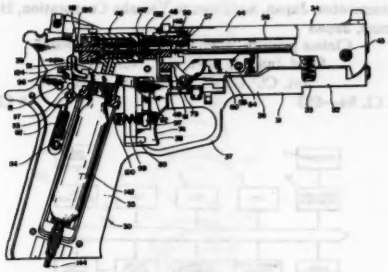
1. A method for producing a superconductor comprising the steps of combining a plurality of metal bodies to form a composite structure, said metal bodies being selected from the transition metals niobium, titanium, zirconium and vanadium, alternate bodies being formed of different transition metals to form pairs, reacting the transition metals to cause diffusion of at least one metal into the other metal to form a ductile superconducting alloy as a result of this diffusion, limiting the extent of the reaction so as to maintain the cross-sectional thickness of pure or nearly pure essentially undiffused transition metal along with the superconducting alloy in at least one of each said pair of transition metals which is about equal to the thickness of diffused superconducting alloy, with a partially diffused zone separating each superconducting zone from each undiffused zone, mechanically reducing the composite structure and providing further diffusion to produce a superconducting layer in contact with a non superconducting layer in each said pair, each said layer being less than 1000 Å thick.

5,160,795

GUN WITH PIVOTING BARREL, ROTARY AMMUNITION CYLINDER, AND DOUBLE ACTION FIRING MECHANISM

Keith L. Milliman, Fairport, N.Y., assignor to Crosman Corporation, East Bloomfield, N.Y.

Filed Jul. 29, 1991, Ser. No. 737,209
Int. Cl.[5] F41C *3/10*
U.S. Cl. 42—65 13 Claims



1. A gun comprising:

a frame,

a barrel assembly pivotably mounted on the frame for movement between a firing position and a loading position, the barrel assembly including an elongated barrel, a cylinder rotatably mounted on the barrel assembly for rotation about an axis which extends parallel to the longitudinal axis of the barrel, the cylinder being provided with a plurality of means for retaining a projectile, and indexing means mounted on the barrel assembly for rotating the cylinder to align one of the projectile-retaining means with the barrel,

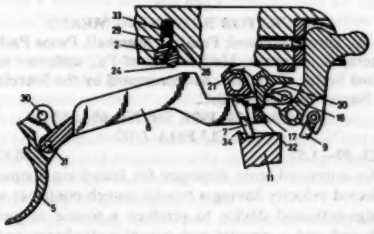
a trigger mounted on the frame for movement between a rest position and a firing position, the trigger being engageable with the indexing means when the barrel assembly is in the firing position for causing movement of the indexing means and the cylinder when the trigger is moved from the rest position toward the firing position.

5,160,796

AUTOMATIC SMALL ARM

Martin Tuma, Allmendstrasse 31B, 4503 Solothurn, and Vaclav Brunclik, Lättenstrasse 106, 8142 Uitikon, both of Switzerland

Filed Oct. 7, 1991, Ser. No. 772,491
Int. Cl.[5] F41A *19/38*
U.S. Cl. 42—69.03 10 Claims



1. A handgun including

a frame;

a slide mounted on said frame for a linear reciprocatable movement thereon;

a hammer pivotally mounted to said frame to pivot between a cocked and a firing position, which hammer projects into the path of movement of said slide and includes a detent member having at least one abutment shoulder section;

a hammer rod spring adapted to bias said hammer towards its firing position;

a trigger pivotally mounted to said frame and a trigger rod linked to said trigger and guided to move upon a pulling of the trigger in a direction generally towards said hammer, which trigger rod includes an abutment surface;

a rotatable spring biassed sear arranged to cooperate with said trigger rod and with said detent member, and having a first and a second control edge;

which first control edge is adapted to cooperate with said at least one abutment shoulder section of said detent member in order to lock said hammer against the biassing force of said hammer rod spring in its cocked position; and

which second control edge is adapted to cooperate with said abutment surface of said trigger rod, such that upon a trigger initiated movement of said trigger rod in a direction towards said hammer the abutment surface urges said second control edge to cause a rotation of said sear against its spring bias to rotate said first control edge away from and out of contact with said at least one abutment shoulder section allowing the hammer to snap into its firing position;

in which said detent member of said hammer comprises a second abutment shoulder section located at a distance from said at least one abutment shoulder section;

said sear comprises a control cam adapted to cooperate with a

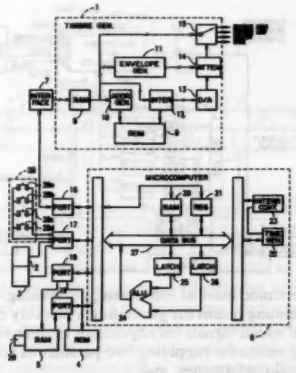
control member located in said slide and adapted to sweep over and contact said control cam in order to depress same upon a moving of said slide on said frame.

5,160,797

STEP-RECORDING APPARATUS AND METHOD FOR AUTOMATIC MUSIC-PERFORMING SYSTEM

Jae Hyun Kim, Anyang, Rep. of Korea, assignor to Goldstar, Co., Ltd., Seoul, Rep. of Korea

Filed Sep. 27, 1991, Ser. No. 766,281
Claims priority, application Rep. of Korea, Sep. 28, 1990, 90-15538
Int. Cl.[5] G10H *1/06, 1/38, 7/00*
U.S. Cl. 84—613 8 Claims



5. A method of performing step-recording of a predetermined sequence of melody chords in an automatic musical-performing system, comprising the steps of:

(a) switching from a main routine to step-recording routine stored in a first memory and setting an address of a second memory for storing step-recording data in response to a key signal generated upon the manual actuation of first

switch means in the course of performing of a main routine,

(b) keying in a selected melody chord and setting a reference resolution value of the selected melody chord, said reference resolution value being a predetermined time duration of said selected melody chord,

(c) increasing or decreasing the reference resolution value of said melody chord by a predetermined factor upon the manual actuation of respective second and third switch means during said step-recording routine, or maintaining said reference resolution value

(d) scanning the key signals generated in response to said selected melody chord,

(e) identifying said selected melody chord and generating a desired format of step-recording data corresponding to said selected melody chord,

(f) generating an enter function key signal upon manual actuation of fourth switch means and storing the step-recording data into the second memory in absence of rhythm and tempo, increasing the address of the second memory by a predetermined unit and then returning the operation to an entry state for the next melody chord in said sequence,

(g) outputting the step-recording data in said second memory, and

(h) inserting rhythm and tempo stored in another memory during a play mode of said main routine for generating a musical performance.

5,160,798

TONE INFORMATION PROCESSING DEVICE FOR AN ELECTRONIC MUSICAL INSTRUMENT FOR GENERATING SOUND HAVING TIMBRE CORRESPONDING TO TWO PARAMETERS

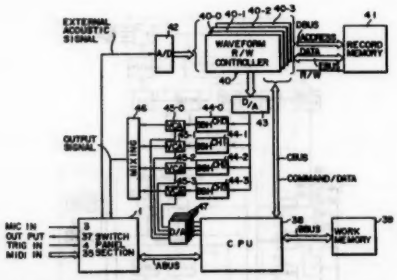
Shigenori Morikawa, Kokubunji; Kohtaro Hanzawa, Fussa; Hiroyuki Sasaki, Fussa, and Hiroshi Morokuma, Fussa, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Division of Ser. No. 388,720, Jul. 31, 1989, Pat. No. 4,970,935, which is a continuation of Ser. No. 72,221, Jul. 10, 1987, abandoned, which is a continuation of Ser. No. 760,290, Jul. 29, 1985, Pat. No. 4,681,008. This application Oct. 31, 1990, Ser. No. 607,446

Claims priority, application Japan, Aug. 9, 1984, 59-167120

Int. Cl.[5] G10H *1/06, 1/18*

U.S. Cl. 84—615 **8 Claims**



5. An electronic musical instrument, comprising:

tone generating means for generating a plurality of different musical sound signals corresponding to different timbres;

supplying means for supplying two parameters according to a musical performance; and

determining means coupled to said tone generating means and to said supplying means for determining a musical sound signal, corresponding to said different timbres, to be generated from said tone generating means in accordance with said two parameters supplied from said supplying means, said plurality of different musical sound signals thereby being selectively generated in order to output a sound having a corresponding timbre in response to said two parameters thus supplied.

5,160,799

ELECTRONIC MUSICAL INSTRUMENT

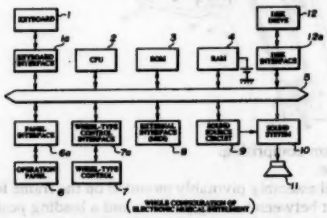
Akira Tozuka; Yasushi Kurakake, and Kotaro Mizuno, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Claims priority, application Japan 3-004035

Filed Jan. 16, 1992, Ser. No. 821,226

Int. Cl.[5] G10H *1/02, 1/06, 1/18*

U.S. Cl. 84—653 **6 Claims**



1. An electronic musical instrument comprising:

a first musical tone signal generating means for generating a first musical tone signal;

a second musical tone signal generating means for generating a second musical tone signal;

a manual-operable means, which can be manually operated by a performer so that arbitrary values can be continuously set;

first and second maximum-parameter-variation setting means for setting maximum-parameter-variations, corresponding to a maximum value which can be set by said manual-operable means, for said first and second musical tone generating means independently; and

parameter designating means for designating musical tone parameters of said first and second musical tone generating means on the basis of the value set by said manual-operable means and the maximum-parameter-variations.

5,160,800

OBTURATOR RETAINING MEANS

Bruce W. Travor, Holland; Frank P. Marshall, Penns Park, and Timothy L. Kraynak, Hatboro, all of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 24, 1991, Ser. No. 691,583

Int. Cl.[5] F41A *1/00*

U.S. Cl. 89—1.57 **10 Claims**

1. An improved store dispenser for launching a store at a preselected velocity having a tubular launch container with a cartridge-activated device to produce a source of gas at a breech end and a circular end cap at a discharge end, the improvement comprising:

upper retention means attached at a prespecified location to an inner container wall to provide an inner stopping point;

obturator means adjacent said retention means to receive gas pressure forces; and

tubular section pressure relief means adjacent said obturator

means at a predetermined distance to provide an escape path for excess gas pressure forces, said tubular section

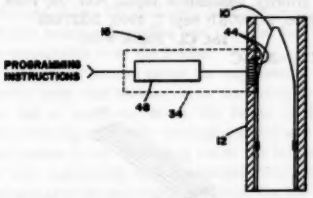
pressure relief means having a bias cut portion facing said obturator means.

5,160,801

POWERLESS PROGRAMMABLE FUZE FUNCTION MODE SYSTEM

David A. Andersen, Mound; Keith A. Kiefer, Ramsey, and Leonard D. Hones, Eden Prairie, all of Minn., assignors to Alliant Techsystems Inc., Minneapolis, Minn.

Filed May 20, 1991, Ser. No. 702,988
Int. Cl.[5] F42C *17/04*
U.S. Cl. 89—6 **12 Claims**



1. In combination with a munition having a casing, a propellant explosive, and a fuze, an electrically powerless system that programs a function mode of said munition fuze for igniting said propellant explosive of said munition, said system comprising:

(a) programmable means that may be oriented at a plurality of rotational angles about a longitudinal axis of said programmable means for presetting the function mode of said fuze, said programmable means including an arrangement of programmable elements located internally of said munition casing, said programmable elements being electrically conductive but remaining electrically unpowered until after firing of said munition; and

(b) a programming mechanism located externally of said munition casing, said mechanism being operable for supplying mechanical power to said programmable means to cause programming of said conductive elements to selectively provide one of a plurality of binary sequences and thereby preset data relating to a desired function mode of said fuze without the necessity of supplying electrical power to said conductive elements.

5,160,802

PRESTRESSED COMPOSITE GUN TUBE

William M. Moscrip, King George County, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 24, 1975, Ser. No. 616,970
Int. Cl.[5] F41A *21/02*
U.S. Cl. 89—16 **12 Claims**

1. A prestressed composite gun tube comprising:

an inner liner tube; and

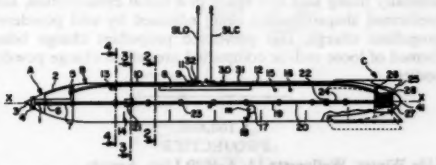
an outer tube of Nitinol alloy encompassing said liner and having a critical transition temperature lower than any temperature the gun tube might experience in its operating environment, said outer tube having been expanded from an initial inner diameter smaller than the outer diameter of said liner while at a temperature below its critical transition temperature whereby said liner is prestressed in compression when the composite tube is at any temperature above the critical transition temperature of the Nitinol alloy.

5,160,803

MUNITION FOR THE DISTRIBUTION OF AN INCENDIARY MIXTURE

Noël Fulchiron, Tigy; Bernard Naillon, Orleans, and Patrick Nadaud, Olivet, all of France, assignors to Thomson-Brandt Armements, Boulogne Billancourt, France

Filed Nov. 27, 1990, Ser. No. 618,479
Int. Cl.[5] F42B *12/44, 12/46*
U.S. Cl. 102—363 **21 Claims**



11. Munition comprising along a longitudinal axis XX' a front part (A) and a rear part (C) attached to a central part (B), said central part having a reservoir and an external envelope, the reservoir being designed to be filled with an incendiary mixture, said reservoir comprising a detonating cord (20) positioned along the axis XX'; the detonating cord, upon firing of an initiating device (3), propagating a detonation wave; and positioning means for positioning, within said reservoir, a plurality of gas generating grains, circumferentially at various longitudinal places around the detonating cord and also for positioning, within said reservoir, a plurality of expellable ignition capsules (23), circumferentially at various longitudinal places around the detonating cord; the gas generating grains (21, 22) scattering the incendiary mixture, and the ignition capsules igniting the incendiary mixture while and after scattering.

5,160,804

FIN-STABILIZED PROJECTILE

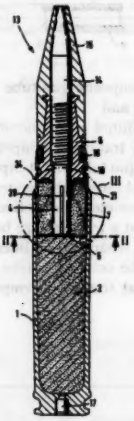
Gero Wähner, Schramberg, and Dieter Girke, Troisdorf, both of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Oberndorf and Dynamit Nobel AG, Troisdorf, both of, Fed. Rep. of Germany

Filed Jul. 1, 1991, Ser. No. 723,808

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1990, 4020691

Int. Cl.[5] F42B *5/00*

U.S. Cl. 102—443 **14 Claims**



1. Ammunition, comprising: a cartridge case containing a powdered propellant charge; a fin-stabilized subcaliber projectile having a tail-side tail plane extending into said cartridge case, said subcaliber projectile having a projectile body which is surrounded by said cartridge case in an annular manner, said subcaliber projectile having tail plane fins defining a free space between adjacent fins; preformed shaped bodies, formed from a high energy density propellant material that can be burned in an exothermic process, each of said preformed shaped bodies having a radial cross-sectional shape which is similar to the shape of the free space and being positioned between adjacent fins at least partially filling said free space between and adjacent to said tail plane fins, said preformed shaped bodies substantially filling said free space in a radial cross-section, said preformed shaped bodies being adjoined by said powdered propellant charge, said powdered propellant charge being formed of loose and/or compacted propellant charge powder bodies.

5,160,805

PROJECTILE

Udo Winter, Wallnerstr 14, A-4020 Linz, Austria

PCT No. PCT/AT89/00066, § 371 Date Jan. 22, 1991, § 102(e) Date Jan. 22, 1991, PCT Pub. No. WO90/01669, PCT Pub. Date Feb. 22, 1990

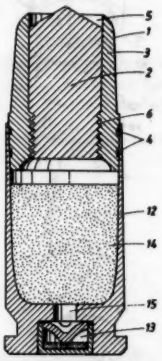
PCT Filed Jul. 26, 1989, Ser. No. 613,675

Claims priority, application Austria, Aug. 2, 1988, 1947/88

Int. Cl.[5] F42B *12/06, 12/34, 12/78*

U.S. Cl. 102—518 **8 Claims**

1. A projectile for a cartridge for a hand-held firearm having a barrel of a predetermined caliber, the projectile comprising a core having a maximum diameter, and a jacket surrounding the core and having an outer surface of a diameter corresponding to the caliber, an inner surface of a diameter corresponding to the maximum core diameter and an open forward outer end opposite the cartridge, the core having a tip extending freely through the open jacket end, the core consisting of a hard material and the jacket consisting of a material softer than the core material, the core material having a higher specific gravity than the jacket material, and the core having deformed peripheral portions extending radially outwardly to an extent substantially equal to the maximum core diameter and into the inner jacket surface to establish a positive joint means between



the core and the jacket, the positive joint means being firm enough to hold the core and jacket together upon impact on a softer target but not strong enough to resist an impact on a hard target.

5,160,806

ELECTROMAGNETIC SHIELDING MEMBER AND ELECTROMAGNETIC SHIELDING CASE

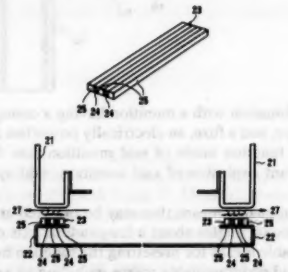
Takashi Harada; Ken-ichi Hatakeyama; Norio Masuda; Noboru Fujihara, all of Tokyo, and Masayuki Inomata, Miyagi, all of Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Nov. 28, 1990, Ser. No. 619,065

Claims priority, application Japan, Nov. 29, 1989, 1-309699; Apr. 25, 1990, 2-109757; Sep. 7, 1990, 2-237440

Int. Cl.[5] H05K *9/00*

U.S. Cl. 174—35 GC **13 Claims**



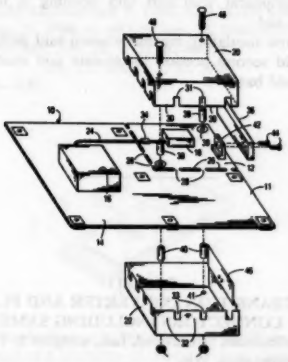
1. An electromagnetic shielding assembly comprising strips of soft magnetic material, each of said strips having a rectangular cross-section, and conductive strips each having a rectangular cross-section, said soft magnetic strips and conductive strips being alternately arranged to constitute a plate-like member, wherein said soft magnetic strips and conductive strips are alternately exposed on a surface of said plate-like member, and said plate-like member is arranged in a gap between conductive walls which are not in conductive contact with each other, electromagnetic waves being able to leak through said gap, such that surfaces of said plate-like member oppose the conductive walls.

5,160,807

METHOD FOR RFI/EMI PROTECTION OF ELECTRONIC CIRCUITRY

John J. Fry, Wickliffe, and George R. Hall, II, Geneva, both of Ohio, assignors to Elsag International B.V., Netherlands

Filed Aug. 8, 1991, Ser. No. 743,481
Int. Cl.[5] H05K 9/00
U.S. Cl. 174—35 R 14 Claims



1. A radio frequency and electromagnetic interference protection arrangement for a circuit board carrying at least one protected circuit portion requiring radio frequency and electromagnetic interference protection, and an unprotected circuit portion, comprising:

a circuit board having a protected area carrying the protected circuit portion and an unprotected area carrying the unprotected circuit portion, the circuit board including at least one alternating slot and bridge forming a boundary between the protected area and the unprotected area;

a downwardly open top cover having at least one finger and at least one recess for engaging over the protected area, the finger being engageable into the slot and the recess being engageable over the bridge;

an upwardly open bottom cover for engagement under the protected area, the bottom cover including at least one finger and at least one recess, the finger of the bottom cover extending upwardly through the slot and the recess of the bottom cover extending under the bridge;

at least one connecting line connected between the protected and unprotected circuit portions, the line extending along the bridge; and

means for grounding the top and bottom covers to the circuit board.

5,160,808

ACCESS MEANS FOR FLUSH FLOOR FITTING

Robert W. Hadfield, Parkersburg, W. Va., assignor to Butler Manufacturing Company, Kansas City, Mo.

Continuation of Ser. No. 424,721, Oct. 20, 1989, abandoned, which is a division of Ser. No. 222,054, Jul. 20, 1988, Pat. No. 4,883,924. This application Sep. 13, 1991, Ser. No. 759,885
The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.
Int. Cl.[5] H02G 3/12
U.S. Cl. 174—48 5 Claims

1. In combination:

flat, round plate means;

a pair of radially extending slots formed in said plate means; each said slot being formed with facing keys;

each slot having a slider with keyways receiving said keys; and

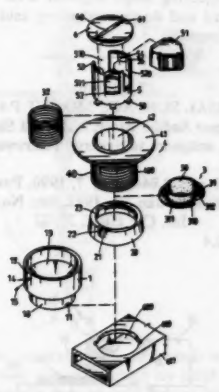
each slider being moveable in its slot, the inner end of each slot and the opposite ends of each slider having substantially identical semi-circular surfaces.

5,160,809

STRUCTURE OF WIRE CONDUIT TERMINAL ASSEMBLY

Chin-Hui Yang, 4F., No. 2, Lane 409, Chung Cheng Rd., Hsin Tien City, Taipei Hsien, Taiwan

Filed Mar. 11, 1991, Ser. No. 666,941
Int. Cl.[5] H02G 3/28
U.S. Cl. 174—48 1 Claim



1. A terminal assembly for a terminal outlet of an electric wire conduit, comprising a connector fastened in a terminal outlet of an electric wire conduit, said connector holding a nut fastened to a socket member through a screw joint, said socket member having a locating seat fastened therein, said locating seat holding a spring supporting a plug socket holder, said plug socket holder holding at least one electric plug socket, and a cover plate covering said plug socket holder;

said socket member having a cylindrical bottom neck with an outer thread screwed in said nut by said screw joint and a top with a broad, circular flange; a center hole passing through a central axis of said socket member; said center hole having a projecting strip transversely disposed at a lower position thereof and a plurality of spaced retaining

blocks around an inner wall surface thereof at a higher position thereof;

said locating seat including a cylindrical body set in said center hole of said socket member at a bottom thereof, said cylindrical body having a circular flange obliquely projecting upwards and outwards and defining a tapered surface portion for holding said spring supporting said plug socket holder, said tapered surface portion having a top with a plurality of elongated slots and a side with a notch locking said projecting strip of said socket member therein;

said plug socket holder including a cylindrical body with a receiving space for holding said at least one electric plug socket, a wiring hole at a center thereof for connecting electric wire from said wire conduit to said plug socket, a bottom with a plurality of spaced projecting strips extending around a periphery thereof;

said cylindrical body having three openings for exposing an outlet of said at least one electric plug socket, a top with two raised blocks transversely projecting inwards at opposite locations each respectively containing a bolt hole therein, and a projecting edge extending around a topmost surface portion thereof;

said cover plate receiving said projecting edge of said plug socket holder and abutting said two raised blocks for covering said receiving space, said cover plate having a top with rectangular slot and two bolts holes at opposite locations through which fastening screws are fastened into said bolt holes on said two raised blocks of said plug socket holder for securing said cover plate to said plug socket holder;

said cover plate rotating said plug socket holder between an open position where said outlet is exposed for electric connection and a closed position where said outlet is completely concealed inside said socket member, so that in said closed position said projecting strips of said plug socket holder are aligned with and held under said retaining blocks of said socket member, and in said open position said projecting strips together with said outlet can move upward and downward along said center hole of said socket member.

5,160,810

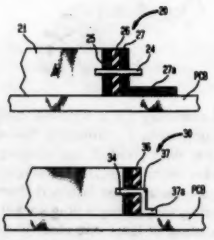
UNIVERSAL SURFACE MOUNT PACKAGE

Meta Rohde, Upper Saddle River, N.J., and Shankar R. Joshi, Elmont, N.Y., assignors to Synergy Microwave Corporation, Paterson, N.J.

Division of Ser. No. 519,844, May 7, 1990, Pat. No. 5,122,621. This application Jan. 21, 1992, Ser. No. 823,374

Int. Cl.[5] H01L *23/02*

U.S. Cl. 174—52.4 **22 Claims**



1. A package for housing electronic circuit elements, said package comprising:

a. a base member having a bottom with a bottom surface and at least one peripheral wall which together define an interior region for receiving electronic circuit elements, and an opening in said peripheral wall, said base member being adapted to receive cover means to hermetically seal said interior region;

b. a transmission lead having a first portion disposed in said opening and into said interior region, and a second portion extending towards said bottom surface so that it is at least substantially flush therewith, said second portion being spaced from said peripheral wall;

c. hermetic sealing means disposed in said opening around said first portion so that said first portion is insulated from said peripheral wall and said opening is hermetically sealed; and

d. dielectric insulating means between said peripheral wall and said second portion to insulate said second portion from said base.

5,160,811

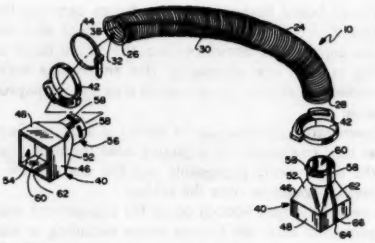
DUCT TRANSITION CONVERTER AND FLEXIBLE CONNECTORS INCLUDING SAME

James M. Ritzmann, Greenwood, Ind., assignor to Tyton Corporation, Milwaukee, Wis.

Filed Apr. 27, 1990, Ser. No. 515,239

Int. Cl.[5] H02G *3/28;* **H01B** *17/58;* **F16B** *7/04*

U.S. Cl. 174—68.3 **22 Claims**



20. A kit of parts for making a flexible transition connector for connecting end portions of a pair of spaced apart wiring ducts, said kit comprising: a length of flexible tubing having a pair of opposed ends and having a longitudinally extending axial slit extending the length thereof defining an interior space accessible through said slit for receiving a plurality of wires or cables in loose or bundled form; a pair of transition converters, each transition converter including an elongate generally tubular converter body having a first end with a resilient cuff portion having a first cross-sectional configuration for clampingly engaging an end portion of one said wiring duct and having an opposed second end with an elongate sleeve portion having a second generally circular cross-sectional configuration, said converter body defining an internal passageway for receiving a plurality of wires or cables, the sleeve portion of each transition converter being adapted to be closely telescopically received in and engaging an end of the flexible tubing, each said transition converter further including means for cooperatively engaging the respective end of said flexible tubing, each said transition converter body further including means for providing lateral access to said passageway to permit wires or cables to be added or removed from said passageway in use; and a pair of clamps receivable over the ends of said tubing for releasably securing each tubing end to one said sleeve portion.

5,160,812

FLAT WIRE HARNESS ATTACHING UNIT

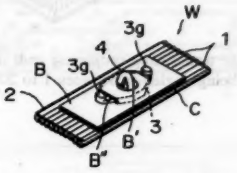
Mineo Takahashi; Susumu Nakayama; Satoshi Suzuki, all of Shizuoka; Akio Mori; Hiroyuki Seo, both of Gotenba; Minoru Imamura, Shizuoka; Hiroshi Tanaka, Shizuoka, and Norihiro Yoneyama, Toyota, all of Japan, assignors to Yazaki Corporation, Tokyo, Japan

Division of Ser. No. 55,934, Jun. 1, 1998. This application Feb. 23, 1990, Ser. No. 474,612

Claims priority, application Japan, Jun. 4, 1986, 61-128157; Jun. 4, 1986, 61-128158; Jun. 4, 1986, 61-128159; Jun. 24, 1986, 61-95327; Jun. 24, 1986, 61-95328; Jun. 24, 1986, 61-95329; Jun. 24, 1986, 61-95330; Jun. 25, 1987, 62-069085

Int. Cl.[5] H02G *3/02, 3/26*

U.S. Cl. 174—135 11 Claims



1. A flat wire harness attaching unit for installing a flat wire harness formed of a plurality of wires covered with synthetic resin insulation, said plurality of wires being bundled and united into a flat integral structure having a first surface and a second surface by said synthetic resin insulation, said wire harness attaching unit comprising:

a clip section (4) provided for association with a vehicle body side;

a base section (3) formed integral with said clip section;

a planar securing member (B) made of a material capable of being made integral with said synthetic resin insulation of the flat wire harness through fusion and having an area larger than the base section, said planar securing member being formed with a central opening (B') therein through which said clip section extends, said planar securing member being adapted to secure said base section when fused with the first surface of the flat wire harness, said planar securing member further having a pair of apertures (B") on both sides of the opening; and

spacer means (3g) connected to opposite ends of said base section and adapted to project through said pair of apertures in said planar securing member toward the vehicle body side for preventing said planar securing member from contacting a vehicle body.

5,160,813

CORDLESS DIGITIZER LOCAL CONDUCTOR PHASE REFERENCE SYSTEM

James S. Watson, Phoenix, Ariz., assignor to Calcomp Inc., Anaheim, Calif.

Filed Sep. 27, 1991, Ser. No. 767,112

Int. Cl.[5] G08C *21/00*

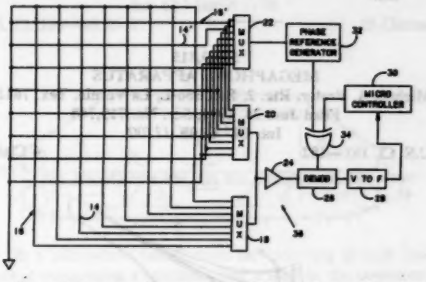
U.S. Cl. 178—19 8 Claims

1. In an electro-magnetic, cordless digitizer system wherein a transducer emits an AC magnetic field which is detected by a first grid of scanned parallel first wires in a tablet, the improvement for obtaining a phase reference signal to be used in a demodulator demodulating data signals from the first grid of scanned parallel first wires comprising:

a) a first multiplexer connected to the first grid of scanned parallel first wires for connecting individual ones of said first wires to an output thereof, said output of said first multiplexer being connected to provide data signals therefrom;

b) a second multiplexer connected to the first grid of scanned parallel first wires for connecting individual ones of said first wires to an output thereof, said output of said second multiplexer being connected to provide a phase reference signal to the demodulator; and,

c) logic means connected to said first multiplexer and said second multiplexer for first scanning said first wires to determine ones of said first wires close to a present location of the transducer and for then using said second multiplexer to connect a one of said first wires displaced from said ones of said first wires close to a present location of the transducer a sufficient distance to provide a valid and usable voltage for use in generating a phase reference signal to the demodulator.



5,160,814

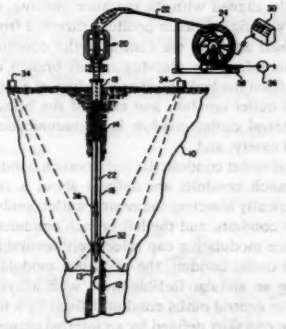
HYDRAULICALLY-ACTUATED DOWNHOLE SEISMIC SOURCE

Steven G. Petermann, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 18, 1990, Ser. No. 554,620

Int. Cl.[5] G01V *1/40*

U.S. Cl. 181—106 5 Claims



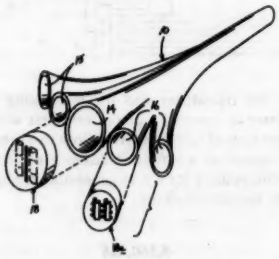
1. A system for generating seismic signals in a wellbore for transmission of said signals through an earth formation into which said wellbore is formed, said system comprising:

an elongated tubing string extending within said wellbore, said tubing string being connected to a source of hydraulic pressure fluid;

apparatus connected to an end of said tubing string extending within said wellbore, said apparatus including body means, opposed pads supported by said body means and being radially extensible from said body means for engagement with the borewall of said wellbore, said pads being connected to respective pairs of opposed arms, at least one pair of said arms being connected to a head disposed on said body means, means for generating a seismic signal for transmission to said pads and into said earth formation including a piston disposed in a bore formed in said body

means for axial reciprocating movement with respect to said wellbore and said pads, means interconnecting said head with said piston and valve means for valving pressure fluid act on said piston to generate forces by said piston for transmission through said head and said pads into said earth formation for generating said seismic signal.

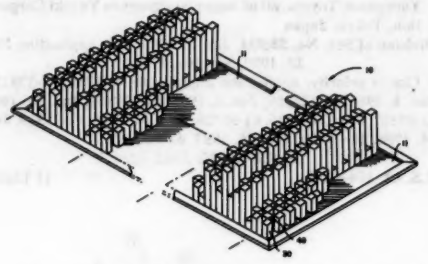
5,160,815
MEGAPHONE APPARATUS
Michael A. Prater, Rte. 2, Box 356-L, La Vernia, Tex. 78121
Filed Jun. 24, 1991, Ser. No. 719,748
Int. Cl.[5] G10K *11/00*
U.S. Cl. 181—182 **4 Claims**



1. A megaphone apparatus, comprising,
a central conical conduit, the central conical conduit including an entrance opening coaxially aligned with the conical conduit at a first end thereof, and
the central conical conduit directed into an outwardly flaring forward body to define a central cavity defined by the conduit and the body, and
a central outlet conduit directed through the forward body coaxially aligned with the entrance opening, and
a plurality of right branch conduits directed from the body positioned adjacent the central outlet conduit to a right side thereof, and a plurality of left branch conduits directed from the body positioned adjacent a left side of the central outlet conduit, and each of the branch conduits and central outlet conduit in communication with the central cavity, and
the central outlet conduit, the right branch conduits, and the left branch conduits are defined about a central plane diametrically bisecting the central outlet conduit, the right branch conduits, and the left branch conduits, and
a residence modulating cap selectively securable about the central outlet conduit, the residence modulating cap including an annular flexible web, with a cylindrical cap skirt, the central outlet conduit defined by a first diameter and the cap skirt defined by an internal diameter equal to the first diameter, and the flexible web including a diametrically enclosed slit directed through the web.

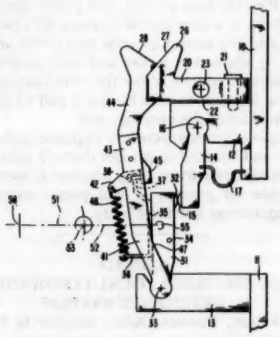
5,160,816
TWO DIMENSIONAL SOUND DIFFUSOR
Bernard W. Chlop, Poolesville, Md., assignor to Systems Development Group, Poolesville, Md.
Filed Oct. 17, 1990, Ser. No. 598,403
Int. Cl.[5] E04B *1/82*
U.S. Cl. 181—285 **13 Claims**

1. A sound diffusor for diffusing sound in two dimensions, comprising:
a plurality of wells of different widths and depths, said wells being defined by a matrix of a plurality of projecting elements of different heights, said projecting elements being arranged in a plurality of parallel rows, a plurality of the projecting elements having a terminating projecting



end and the terminating projecting ends of the projecting elements being angled at between 1 to 20° .

5,160,817
ELECTRICAL SWITCH CONTACT ARRANGEMENT HAVING QUICK BREAK ARCING CONTACTS
Dominik M. Wiktor, Cranford, and Siegfried Schlindwein, Succasunna, both of N.J., assignors to Automatic Switch Company, Florham Park, N.J.
Filed Nov. 21, 1990, Ser. No. 616,390
Int. Cl.[5] H01H *33/12, 9/38*
U.S. Cl. 200—146 R **12 Claims**



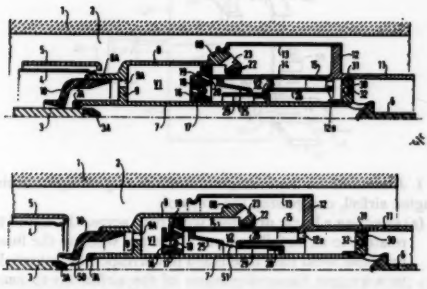
1. An electrical switch contact arrangement comprising:
stationary main and arcing contacts,
movable main and arcing contacts cooperable with the stationary main and arcing contacts, respectively,
operator means for moving the movable contacts into engagement with the stationary contacts to close the switch and for moving the movable contacts out of engagement with the stationary contacts to open the switch,
means responsive to movement of the movable main contact away from the stationary main contact for initiating the opening of the arcing contacts without actually separating the movable and stationary arcing contacts, and resilient means cooperable with the movable arcing contact for the purpose of thereafter snapping the movable arcing contact away from the stationary arcing contact at a high rate of speed to rapidly open the arcing contacts.

5,160,818

SERIES-ARC HIGH TENSION CIRCUIT-BREAKER

Denis Dufournet, Bron, and Michel Perret, Bourgoin-Jallieu, both of France, assignors to GEC Alsthom SA, Paris, France

Filed Apr. 22, 1991, Ser. No. 688,797
Claims priority, application France, Apr. 26, 1990, 90 05326
Int. Cl.[5] H01H *33/88*
U.S. Cl. 200—148 A 5 Claims



1. A high tension circuit-breaker containing dielectric gas under pressure and including, at least one interrupting chamber per phase, each interrupting chamber comprising an insulating case filled with said gas, and containing the following:

a fixed assembly comprising a fixed main contact and a fixed arcing contact which are electrically connected to a first terminal;

a moving assembly comprising a drive member which is integral with a first tube constituting a moving primary arcing contact, and with a second tube which is coaxial with said first tube and which has a first end constituting a moving main contact and carrying a blast nozzle, said first and second tubes partially delimiting a blast, first volume closed by a perforated annulus interconnecting said tubes and by a first, fixed blast piston; and

two secondary arcing contacts disposed in a second volume situated on the opposite side of the blast piston from said blast first volume; and

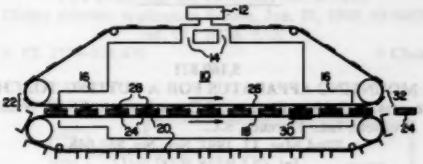
wherein said first, fixed blast piston is supported by a third metal tube which is coaxial to the first tube and which co-operates therewith and with a second piston which is an integral part of said first tube to delimit said second volume, said third tube being fixed by an insulating tubular portion to a fourth tube which is electrically connected to a second terminal of the circuit-breaker, said second tube having a second end in electrical contact both with the outside of said third tube and with the fingers electrically connected to said fourth tube, one of said secondary arcing contacts being fixed to said third tube and another of said secondary arcing contacts being fixed to said fourth tube, said secondary arcing contacts making contact with a fifth tube integral with the moving assembly and comprising an insulating tubular portion and a metal tubular portion, the respective positions and lengths of said two tubular portions being chosen so that in the engaged position, at least one of the secondary arcing contacts makes contact with the insulating portion, such that during opening, said two secondary arcing contacts initially make contact simultaneously with the metal portion, and later at least one of said secondary arcing contacts leaves said metal portion.

5,160,819

MICROWAVE TUNNEL OVEN HAVING MEANS FOR GENERATING HIGHER ORDER MODES IN LOADS

Melville D. Ball; Christine E. Gallerneault; Bryan C. Hewitt, and Claude P. Lorenson, all of Kingston, Canada, assignors to Alcan International Limited, Montreal, Canada

Filed Mar. 11, 1991, Ser. No. 667,756
Int. Cl.[5] H05B *6/78*
U.S. Cl. 219—10.55 A 19 Claims



1. In a microwave tunnel oven for receiving at least one package comprising a container and a load in the container, which load is to be heated by microwave energy, the oven comprising conveyor means extending through the oven, said conveyor means having carrier means for receiving the package at an input end of the oven and for conveying the package through the oven to an output end thereof and means for irradiating the package with microwave energy during its transit through the oven;

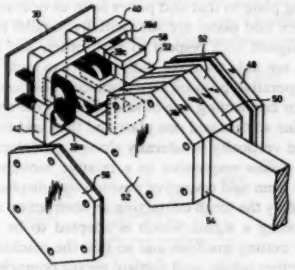
the improvement comprising means for modifying the microwave field in the load during its irradiation in a manner to generate higher order modes of microwave energy in the load to enhance the uniformity of heating throughout the load, said field modifying means being at least in part formed on the conveyor means.

5,160,820

WELDING TRANSFORMER AND METHOD OF MANUFACTURING SAME

Gen Tsujii; Nobuo Kobayashi, and Fumitomo Takano, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 18, 1991, Ser. No. 671,110
Claims priority, application Japan, Mar. 30, 1990, 2-83319; Mar. 30, 1990, 2-83322
Int. Cl.[5] B23K *11/24*; H01F *19/00*
U.S. Cl. 219—116 11 Claims



1. A welding transformer comprising:

primary and secondary coils disposed closely to each other;

a base board;

one of said primary and secondary coils comprising a plurality of spaced juxtaposed coil units mounted on said base board, each of said coil units comprising a plurality of juxtaposed coil unit elements with insulating members interposed therebetween, each of said coil unit elements comprising a plurality of turns of a conductive member,

and a plurality of conductors mounted on said base board and electrically interconnecting said coil unit elements; and

a core disposed closely to said coil units;

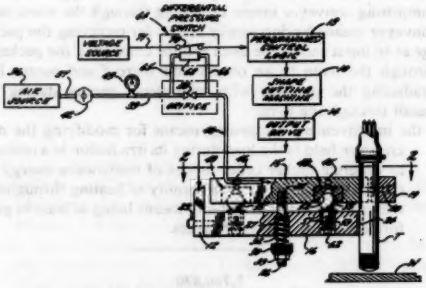
said base board having a plurality of apertures corresponding to the number of the coil unit elements, said coil unit elements having ends inserted into said apertures, respectively, thereby securing said coil units to said base board.

5,160,821

MOUNTING APPARATUS FOR A CUTTING TORCH

Thomas F. Oakley, Florence, S.C., assignor to ESAB Welding Products, Inc., Florence, S.C.

Filed Mar. 17, 1992, Ser. No. 852,648
Int. Cl.[5] B23K *9/00, 9/12*
U.S. Cl. 219—121.56 **14 Claims**



1. An apparatus for mounting a cutting torch to a shape cutting machine, with the apparatus being characterized by the ability to detect contact between the torch and an obstruction during movement of the torch by the shape cutting machine in either the vertical or lateral directions, and comprising

a torch supporting plate,

means for rigidly connecting said supporting plate to said torch and so that said plate lies in a plane which extends laterally from the torch,

a movement sensing plate,

means resiliently connecting said sensing plate to said supporting plate so that said plates lie in an operative position wherein said plates are substantially parallel to and laterally aligned with respect to each other, and so that said plates are able to move with respect to each other from said operative position to a displaced position,

means for connecting one of said plates to the shape cutting machine so that said one plate and thus said torch may be moved vertically or laterally along a predetermined path,

control means responsive to a relative movement of said plates from said operative position to a displaced position caused by the torch contacting an obstruction and for then generating a signal which is adapted to be sent to the shape cutting machine and so that the machine may take corrective action, said control means comprising

(a) a pressurized gas source,

(b) a gas line connected to said source,

(c) valve means operatively connected to said gas line for closing said gas line when said plates are in said operative position and for at least partially opening said gas line upon said plates relatively moving to a displaced position, and

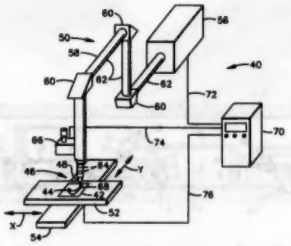
(d) switch means responsive to said gas line being opened by said valve means for generating a signal.

5,160,822

METHOD FOR DEPOSITING MATERIAL ON THE TIP OF A GAS TURBINE ENGINE AIRFOIL USING LINEAR TRANSLATIONAL WELDING

Stephen Aleshin, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed May 14, 1991, Ser. No. 701,403
Int. Cl.[5] B23K *26/00*
U.S. Cl. 219—121.64 **13 Claims**



1. A method for depositing material on a tip of a gas turbine engine airfoil, comprising the steps of:

(a) selecting a linear principal weld path across the airfoil tip relative to an airfoil contour at the tip, wherein the linear principal weld path is selected to correspond substantially to a longest linear dimension of the airfoil tip to cause substantially uniform propagation of a heat front, caused by the welding, across the longest linear dimension of the airfoil tip to utilize substantially a maximum amount of airfoil material as a heat sink;

(b) selecting a weld bead stitch pattern to substantially completely cover the airfoil tip, the stitch pattern crisscrossing the linear principal weld path between opposite edges of the airfoil and advancing across the airfoil in the direction of the linear principal weld path; and

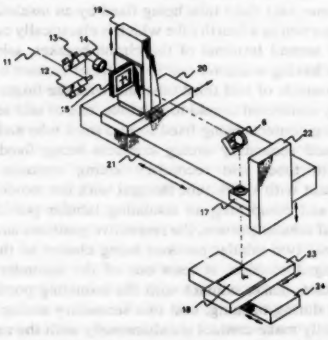
(c) depositing at least a first layer of tip material corresponding to the weld bead stitch pattern and the linear principal weld path by welding.

5,160,823

MOVING MASK LASER IMAGING

Jeffry S. Bennin, and Mark O. Dustrude, both of Hutchinson, Minn., assignors to Hutchinson Technology, Inc., Hutchinson, Minn.

Filed Jan. 3, 1991, Ser. No. 638,733
Int. Cl.[5] B23K *26/00*
U.S. Cl. 219—121.68 **17 Claims**



1. In a method for defining and removing small image patterns from a work piece which includes the steps of directing

a laser beam through a portion of a mask etched with two dimensional pattern of the image to be applied to the work piece and magnifying the image pattern with a focusing lens for projection onto the surface of the work piece, the improvement which comprises the steps of:

a. mounting the mask for movement transverse to the axis of the laser beam;

b. mounting the work piece for movement transverse to the axis of the laser beam; and

c. moving the mask and work piece in synchronism with each other to expose all of the portions of the image on the mask thereby ablating the work piece in accordance with the pattern of the image from the mask.

5,160,824

MACHINE TOOL FOR LASER-BEAM MACHINING OF WORKPIECES

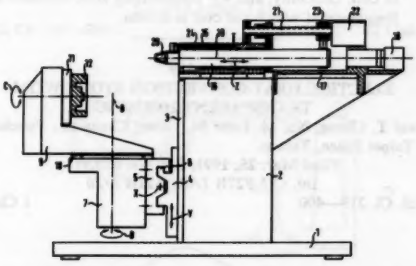
Werner Babel, Pfronten, Fed. Rep. of Germany, assignor to MAHO Aktiengesellschaft, Pfronten, Fed. Rep. of Germany

Continuation of Ser. No. 809,435, Dec. 18, 1991, abandoned. This application Apr. 28, 1992, Ser. No. 877,252

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1990, 4040554

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.68 9 Claims



1. A machine tool for laser beam machining of workpieces, the machine tool having a column extending from a base, the machine tool comprising:

a housing mounted on said column, said housing having a longitudinal axis;

a motor-driven hollow main spindle journaled within said housing;

a laser unit mounted on said column at one end of said housing;

locking elements adapted for fixing a tool holder within said main spindle;

a nozzle head secured at the end of said main spindle opposite to said laser unit, said nozzle head having means for supplying at least one fluid to the central exit opening of the laser beam; and

a focusing optical system in said nozzle head for focussing the laser beam.

5,160,825

PROCESS AND DEVICE FOR SUPPLYING PROCESSING GAS TO A REACTOR LOCATED IN A ZONE SUBJECTED TO INTENSE ELECTRIC AND/OR ELECTROMAGNETIC FIELDS

Patrick Genou, Voisins le Bretonneaux, France, assignor to Eferel S.A., Neauphle le Chateau, France

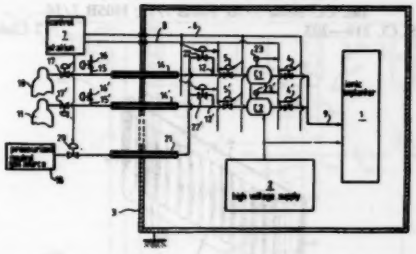
PCT No. PCT/FR89/00251, § 371 Date Feb. 20, 1990, § 102(e) Date Feb. 20, 1990, PCT Pub. No. WO89/12908, PCT Pub. Date Dec. 28, 1989

PCT Filed May 26, 1989, Ser. No. 477,812

Claims priority, application France, Jun. 21, 1988, 88 08290

Int. Cl.[5] B23K *9/00*

U.S. Cl. 219—121.430 9 Claims



1. Process for supplying, with processing gas, a reactor operating by means of a high voltage current and situated in a zone subjected to intense electric and/or electromagnetic fields likely to cause ionization of said gas, said zone being insulated electrically from its outer environment by at least one electrically conducting wall forming a potential barrier, said process consisting in supplying said reactor with gas by means of at least one intermediate container filled periodically during filling phases from a gas source situated outside said zone, during interruptions of the high voltage current, by means of at least one pipeline passing through the wall, this pipeline being made from an electrically insulating material at least in a portion passing through said wall and in that each of said filling phases is followed by closure of said pipeline by closure means situated in said zone, and evacuation of said gas at least in said portion.

5,160,826

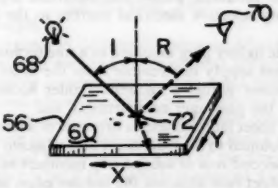
FT-IR SPECTROMETER WINDOW AND METHOD

Joel A. Cohen, Shaker Heights, and R. Craig Virnelson, Chesterland, both of Ohio, assignors to Tremco Incorporated, Cleveland, Ohio

Filed Oct. 3, 1991, Ser. No. 770,699

Int. Cl.[5] G01N *21/35, 21/55*

U.S. Cl. 250—339 16 Claims



9. Apparatus comprising an FT-IR spectrometer including a window, said spectrometer adapted for analyzing a sample supported on said window by reflectance spectroscopy, said spectrometer including visual microscope means for optically viewing said sample, and positioning means for enabling posi-

tioning of said sample in a path traveled by radiation in the infrared range through said spectrometer,

said window comprising:

a body having a surface means for supporting said sample, said body comprised of material generally transparent to radiation in the visible range; and

a coating on said surface means, said coating generally reflective of radiation across the infrared range while enabling passage of radiation in the visible range,

whereby said sample is readily positioned in said path using said visual microscope means.

5,160,827

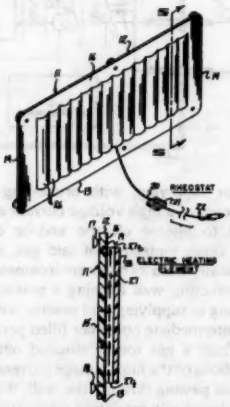
AUTOMOTIVE WINDSHIELD DEICE APPARATUS

Darren L. Parker, 1575 Parker Rd., Nixa, Mo. 65714

Filed Aug. 6, 1991, Ser. No. 740,709

Int. Cl.[5] B60J *1/20*; E06B *7/12*; H05B *3/36*

U.S. Cl. 219—203 **2 Claims**



1. An automotive windshield deice apparatus arranged for securement to a vehicular windshield to an interior surface of the vehicular windshield within a vehicular passenger compartment, wherein the apparatus comprises,

a flexible sheet member, the flexible sheet member including a top edge spaced from and parallel a bottom edge, and spaced side edges, and

the sheet member including a front sheet face and a rear sheet face, with the front sheet face arranged for confrontation with the vehicular windshield within the passenger compartment, and

a serpentine continuous electrical resistance heating coil positioned within the sheet member extending between the top edge, bottom edge, and side edges, and

the heating coil including an electrical supply line, and

a rheostat mounted within the electrical supply line for directing selective electrical current to the heating coil, and

a cigarette lighter plug mounted to a free terminal end of the electrical supply line remote from the sheet member for securement within a cigarette lighter socket positioned within the passenger compartment, and

the front sheet face includes a first row of suction cup members mounted to the front sheet face adjacent the top edge, and a second row of suction cup members mounted to the front sheet face adjacent the bottom edge, and

the rear sheet face includes a plurality of circulatory air tubes arranged in a parallel substantially coextensive relationship between the side edges, wherein the air tube extends orthogonally between the top edge and the bottom edge of the sheet member, and each air tube includes a conduit directed coextensively therethrough, wherein each conduit includes an exit opening adjacent the top edge of the sheet member and an entrance opening adjacent the bottom opening of the sheet member.

5,160,828

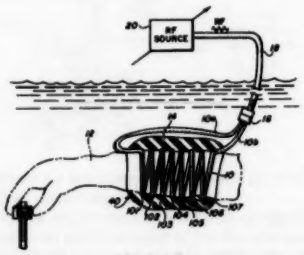
ELECTROMAGNETIC WARMING OF SUBMERGED EXTREMITIES

Richard G. Olsen, Pensacola, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 6, 1990, Ser. No. 489,161

Int. Cl.[5] H05B *1/00*

U.S. Cl. 219—211 **9 Claims**



1. A device for preventing cold induced reductions in the dexterity of extremities comprising:

a coil of several wraps forming an envelope surrounding an extremity;

a water excluding, RF transmitting zone formed of at least one layer of dielectric material substantially free of RF absorbing and reflecting material encompassing the coil envelope and occupying all space between the wraps of the coil;

a variable RF source generating RF energy to drive the envelope coil at a pre-selected frequency, the combination of coil, extremity, and RF transmitting zone resonant at a frequency at which the coil is driven.

5,160,829

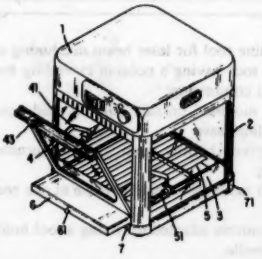
ELECTRIC HEAT-CONVECTION STOVE WITH TRANSPARENT HOUSING

Kwei T. Chang, No. 14, Lane 54, Luong Chuan St., Panchiao, Taipei Hsien, Taiwan

Filed Mar. 25, 1991, Ser. No. 673,911

Int. Cl.[5] F27B *1/00*; A21B *1/26*

U.S. Cl. 219—400 **1 Claim**



1. An electric heat-convection stove, comprising:

a rectangular electric heat-convection control unit having four corners, and having fastening tenons at the four corners thereof, each of said fastening tenons having each a flange thereon;

four alloy posts respectively connected to said electric heat-

convection control unit at each of the four corners thereof, each post having a retaining notch at one end receiving the flange of a respective fastening tenon, and two spaced apart elongated channels along sides thereof;

three rectangular glass side boards received in said elongated channels between each two of said alloy posts;

a plurality of cross bars, one connected between each two of said alloy posts;

a plurality of three-way connectors connecting respectively ends of said cross bars to said alloy posts;

a front door panel having an elongated hand-hold transversely disposed at the top, two stub axles bilaterally disposed at the bottom hingedly attaching said panel to two alloy posts, two notches bilaterally disposed on the backside at suitable height with a cross rod each respectively set therein;

two lever pawls and a rack, said pawls connecting said front panel to said rack, said rack having hooks disposed at two opposite sides for fastening said lever pawls, and two spring means at two opposite sides to match with said lever pawls for controlling the pivot motion of said front panel;

a grease collector having a finger knob on a front side for holding of fingers to pull it out of the stove or push it back into position the front side being disposed below the door panel; and

a base having cushions at the four corners thereof for fastening the opposite end of each of said alloy posts respectively and for supporting said grease collector, said side boards having same dimensions in length and width.

5,160,830

ELECTRIC HOTPLATE

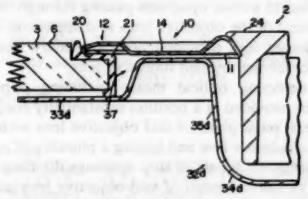
Robert Kicherer, and Felix Schreder, both of Oberderdingen, Fed. Rep. of Germany, assignors to E.G.O. Elektro-Gerate Blanc u. Fischer, Fed. Rep. of Germany

Continuation of Ser. No. 488,315, Mar. 5, 1990, Pat. No. 5,028,762. This application Feb. 13, 1991, Ser. No. 654,826

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1989, 3907029

Int. Cl.[5] H05B 3/70

U.S. Cl. 219—458 **42 Claims**



1. An electric hotplate comprising:

a hotplate mounting unit including a hotplate body having a cooking surface defining a setting plane on a topside of said hotplate mounting unit adapted to be mounted to a mounted operating state in the vicinity of a mounting opening of a mounting plate, said mounting opening defining an inner circumference, said hotplate mounting unit defining an outer circumference and an underside and said mounting plate defining a top standing plane and a bottom side; and shield structure comprising at least one shield surrounding said hotplate for shielding said mounting plate with respect to said hotplate by shielding at least one of zones provided by said inner circumference, said outer circumference, said underside and said bottom side, said at least one shield being located substantially below said standing plane, wherein said at least one shield provides an additional securing means for positionally securing said hotplate with respect to said mounting plate in said mounted operating state, said at least one shield being engageably associated with said mounting plate.

5,160,831

MULTI-MODE CONTROL CIRCUIT AND INDICATOR ARRANGEMENT FOR AN ELECTRICAL APPLIANCE

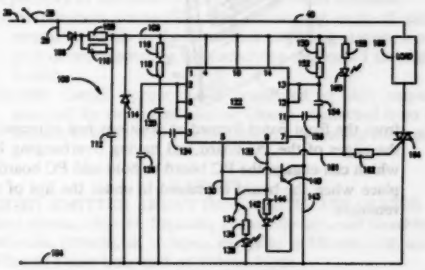
Arnold Thaler, Plantation; Ivan Saad, Miami, both of Fla., and P. C. Yip, Tsuenwan, Hong Kong, assignors to Windmere Corporation, Miami, Fla.

Filed Dec. 6, 1988, Ser. No. 280,365

Claims priority, application United Kingdom, Jun. 7, 1988, 1051334

Int. Cl.[5] H05B 1/02

U.S. Cl. 219—506 **16 Claims**



1. A control circuit for an electrical appliance comprising:

first indicating lamp for representing first condition for said electrical appliance;

second indicating lamp for representing a second condition for said electrical appliance;

third indicating lamp for representing a third condition for said electrical appliance;

first timing means connected to said first indicating and second indicating lamps, which, upon reaching a first predetermined time threshold, extinguishes said first indicating lamp and turns on said second indicating lamp; and

second timing means connected to said second and third indicating lamps and an operative element of said electrical appliance such that, upon reaching a second predetermined time threshold, said second timing means extinguishes said second indicating lamp, deactivates said operative element of said electrical appliance and turns on said third indicating lamp.

5,160,832

FRONT PANEL UNIT FOR ELECTRONIC EQUIPMENT

Thomas G. Hubert, Necedah; Frederick A. Stich; William J. Hazen, both of Wisconsin Rapids, and Ricky Mills, Mauston, all of Wis., assignors to Best Power Technology, Inc., Necedah, Wis.

Filed May 17, 1991, Ser. No. 703,119

Int. Cl.[5] G06C 7/02

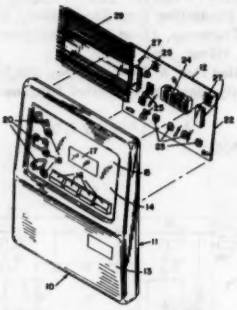
U.S. Cl. 235—145 R **7 Claims**

1. A front panel for electronic equipment allowing communication between a user and the equipment, comprising:

(a) a one-piece molded plastic front panel having a body portion and a faceplate which is viewable by a user, and at least one protruding key formed therein connected by a spring strip to a junction at which the spring strip is integrally joined to the body portion of the front panel, the key having a back face which is adapted to be engaged against a switch when the key is depressed by the user;

(b) means integrally molded with the body portion of the front panel for engaging and holding a PC board to the front panel in position such that a switch on the PC board will be behind the key on the front panel, wherein the means for engaging and holding a PC board include pro-

jecting platforms integrally molded with the body portion of the front panel which extend backwardly from the front panel to top edges which define a support surface for the PC board, and snap retainers extending backwardly



from the front panel formed at positions just adjacent to the edges of the PC board and having overhanging lips which can engage the PC board to hold said PC board in place when the board is pressed in under the lips of the retainers.

5,160,833

MAGNETIC RECORDING MEDIUM HAVING AUTHENTICATING POLES AT ITS EDGE

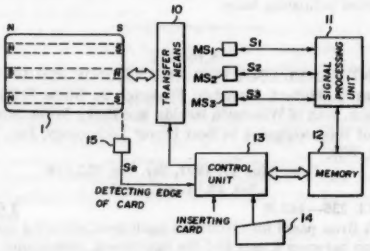
Yoshihiko Nakahara, Tokyo, Japan, assignor to Kyodo Printing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 582,199, filed as PCT/JP88/00369, Apr. 14, 1988, abandoned. This application Jan. 7, 1992, Ser. No. 818,747

Claims priority, application Japan, Nov. 13, 1986, 61-268683

Int. Cl.[5] G06K *7/08, 19/06*

U.S. Cl. 235—449 **2 Claims**



1. A magnetic recording medium having a magnetic layer, said magnetic layer including at least one magnetic recording track formed in said magnetic layer in one direction, two edges of said recording medium being oriented perpendicular to the direction of the recording track and bearing a truth determining code, said code comprising a combination of polarities of magnetic poles formed at predetermined positions of the magnetic layer, which predetermined positions include both of said edges of the recording track, said truth determining code having a predetermined relationship to the contents recorded in the recording track.

5,160,834

MULTIDIRECTIONAL DIVIDED-PUPIL FOCUS DETECTING APPARATUS

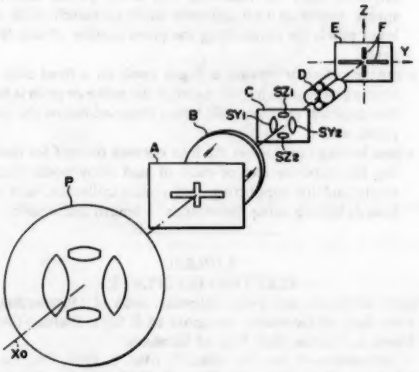
Keiji Moriyama, Yokohama, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Nov. 26, 1990, Ser. No. 617,761

Claims priority, application Japan, Dec. 1, 1989, 1-312675

Int. Cl.[5] G01J *1/20;* **G03B** *3/00*

U.S. Cl. 250—201.8 **10 Claims**



1. A focus detecting apparatus for photoelectrically detecting a plurality of pairs of secondary images formed by light beams from the same object that pass through corresponding pairs of marginal areas on an exit pupil plane of an objective lens, each pair of marginal areas being disposed symmetrically with respect to a main optic axis passing through the center of the exit pupil of the objective lens, said apparatus comprising:

a condenser lens provided near a primary image of said object formed by said objective lens;

focus detecting optical means including pupil dividing means provided at a position substantially conjugate with the exit pupil plane of said objective lens with respect to said condenser lens and having a plurality of pairs of stop openings, each pair of stop openings dividing a marginal area of the exit pupil of said objective lens into a pair of divided pupil areas, each pair of divided pupil areas being disposed symmetrically with respect to said main optic axis, the interval between the centers of stop openings of each pair of stop openings being substantially the same for said plurality of pairs of stop openings, and the radii of circles about said main optic axis that circumscribe respective pairs of stop openings differing from each other, said focus detecting optical means further including re-imaging optical means having a plurality of pairs of imaging lenses provided rearwardly of said pupil dividing means for forming said pairs of secondary images from light beams passed through corresponding pairs of stop openings, each pair of imaging lenses being symmetrically disposed with respect to said main optic axis; and

photoelectric detecting means for receiving said pairs of secondary images and detecting deviation between relative positions of the secondary images of each pair of secondary images.

5,160,835

PHOTOSENSOR HAVING CONDUCTIVE SHIELDING LAYER FOR ELECTROSTATIC CHARGE DISSIPATION

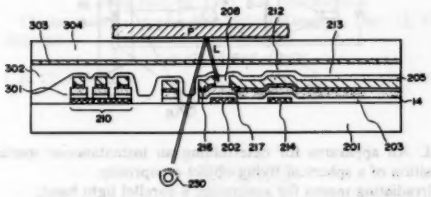
Mineto Yagyu, Sagamihara, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 700,898, May 13, 1991, Pat. No. 5,086,218, which is a continuation of Ser. No. 607,047, Oct. 31, 1990, abandoned, which is a division of Ser. No. 204,520, Jun. 9, 1988, Pat. No. 4,982,079. This application Nov. 7, 1991, Ser. No. 788,942

Claims priority, application Japan, Jun. 12, 1987, 62-146374; Nov. 13, 1987, 62-285617

Int. Cl.[5] H01J *40/14*

U.S. Cl. 250—208.1 5 Claims



1. An electric device having a plurality of photelectric converting elements comprising:

plural switch elements for transferring a charge signal arranged on a substrate;

a transparent insulative protective element disposed over said plural switch elements, wherein said transparent insulative protective element comprises a multi-layer structure; and

a conductive layer adapted to be coupled to a potential source,

wherein at least one layer of said multi-layer structure of said transparent insulative protective element is disposed on each side of said conductive layer.

5,160,836

IMAGE SENSOR INCLUDING A PLURALITY OF LIGHT-RECEIVING ARRAYS AND METHOD OF DRIVING THE SAME

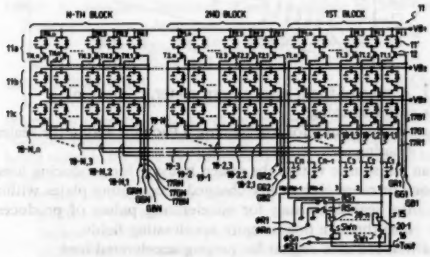
Hiroyuki Miyake, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Mar. 26, 1991, Ser. No. 675,276

Claims priority, application Japan, Mar. 27, 1990, 2-75772

Int. Cl.[5] H01L *27/146*

U.S. Cl. 250—208.1 5 Claims



1. An image sensor comprising:

a plurality of light-receiving element arrays disposed in an auxiliary scanning direction, each of said light-receiving element arrays including a plurality of consecutive 1 through N blocks disposed in a main scanning direction, each of said blocks including a plurality of consecutive 1 through n light-receiving elements, each of said light-receiving elements including an input for connection to a voltage source, an output, and a switching element, each switching element including a gate, an output, and an input connected to the output of the corresponding light-receiving element;

first common connection lines, within each block, commonly connecting the gates of the switching elements of said block, each of said first common connection lines including an input for connecting a driving means to said commonly connected gates for simultaneously driving the switching elements of said block;

second common connection lines connecting the outputs of switching elements of individual light-receiving element arrays, said second common connection lines commonly connecting switching element outputs of corresponding light-receiving elements 1 through n of corresponding blocks 1 through N;

a plurality of consecutive 1 through n output terminals

third common connection lines connecting each of said output terminals to the connected switching element outputs of corresponding light-receiving elements 1 through n; and

electric charge storing means connected to each output terminal for storing an electric charge conducted from a respective light-receiving element by a switching element.

5,160,837

LIGHT EMITTER ARRAY DIAGNOSTIC APPARATUS

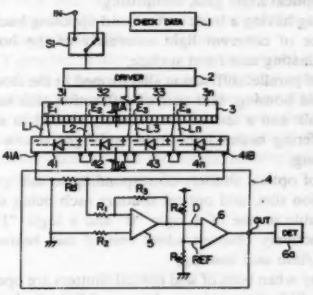
Hideo Hirane, Hitachi; Kiyohiko Tanno, Katsuta, and Kazuhito Masuda, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Cable Ltd., both of Tokyo, Japan

Filed Mar. 15, 1991, Ser. No. 669,957

Claims priority, application Japan, Mar. 15, 1990, 2-62669

Int. Cl.[5] G01D *21/04, 9/04*

U.S. Cl. 250—208.2 20 Claims



1. A light emitter array diagnostic apparatus for diagnosing whether or not a light emitter array including a plurality of light emitter elements is normally emitting light, said apparatus comprising:

a light emitter array unit including a plurality of light emitter elements divided into a plurality of groups of light emitter elements, each group of light emitter elements including at least two light emitter elements;

a check data generator unit for supplying predetermined check data to said light emitter array unit;

a photo detector unit disposed opposite to said light emitter array unit and including at least one photo detector element, each photo detector element receiving light emitted from each light emitter element of at least one of said groups of light emitter elements in response to said check data; and

a diagnostic unit electrically connected to said photo detector unit for diagnosing whether or not at least one of said light emitter elements of each of said groups of light emitter elements is normally emitting light on the basis of the intensity of light emitted from said at least one of said light

emitter elements of each of said groups of light emitter elements.

5,160,838

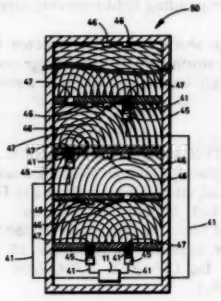
BINARY DATA PROCESSOR USING DIFFRACTION AND INTERFERENCE OF WAVES

Tai-Her Yang, 5-1 Taipin Street, Si-Hu Town, Dzan-Hwa, Taiwan

Continuation-in-part of Ser. No. 372,629, Jun. 28, 1989, abandoned, which is a continuation-in-part of Ser. No. 69,153, Jul. 2, 1987, abandoned. This application Sep. 11, 1990, Ser. No. 580,637

Int. Cl.[5] H01J *31/50*

U.S. Cl. 257—113 **25 Claims**



1. An optical logic gate, comprising:

a housing having a front surface and opposing back surface;

a source of coherent light externally of the housing for illuminating said front surface;

a pair of parallel diffraction slits formed in the front surface of said housing, said pair of diffraction slits including a first slit and a second slit parallely spaced to admit two interfering beams light from said light source into said housing;

a pair of optical shutters corresponding to said pair of diffraction slits, said optical shutters each being selectively operable in one of a logic "0" and a logic "1" state to respectively obstruct/admit one of said beams of light from/into said housing;

whereby when both of said optical shutters are operated in a logic "1" state said two beams of light both enter said housing and form an interference pattern comprising a series of alternating intensity maxima and minima incident along said back surface of said housing, and when both of said optical shutters are operated in a logic "0" state no light enters said housing, and when one of said optical shutters is operated in a logic "1" state while another of said optical shutters is operated in a logic "0" state one of said beams of light enters said housing and falls incident without interference on said back surface of said housing; and

a pair of optical sensors mounted on the back surface of said housing and exposed to said pair of diffraction slits, each of said optical sensors detecting light propagating from said diffraction slits and outputting one of a logic "0" and a logic "1" in accordance with a threshold intensity of light, said pair of sensors further including a first sensor positioned at an intensity minima and a second sensor positioned at an intensity maxima of said interference pattern formed when both of said optical shutters are operated in a logic "1" state.

5,160,839

APPARATUS AND METHOD FOR DETERMINING INSTANTANEOUS SPATIAL POSITION OF SPHERICAL FLYING OBJECT

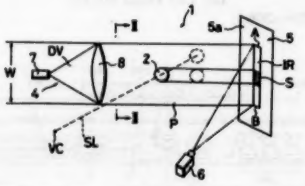
Tetsuji Nishiyama, Akashi, and Takashi Teraguchi, Kobe, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Kobe, Japan

Filed May 21, 1991, Ser. No. 703,751

Claims priority, application Japan, Jun. 4, 1990, 2-147095

Int. Cl.[5] G01V *9/04*

U.S. Cl. 250—222.1 **18 Claims**



1. An apparatus for determining an instantaneous spatial position of a spherical flying object comprising:

irradiating means for generating a parallel light band,

a screen on which said parallel light band is projected to form a linear image region, said flying object being caused to pass transversely through said parallel light band at a position spaced from said screen to form a silhouette within said image region, and

optical sensor means for detecting the position of said silhouette within said image region.

5,160,840

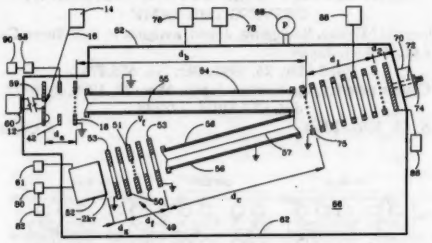
TIME-OF-FLIGHT ANALYZER AND METHOD

Marvin L. Vestal, 7851 Chinon Cir., Houston, Tex. 77011

Filed Oct. 25, 1991, Ser. No. 782,112

Int. Cl.[5] B01D *59/44*; H01J *49/00*

U.S. Cl. 250—287 **20 Claims**



1. A time-of-flight mass spectrometer, comprising:

a sealed housing;

a vacuum pump for maintaining a vacuum within the sealed housing;

an ion source within the sealed housing for producing ions;

one or more electrically-charged accelerating plates within the sealed housing for accelerating pulses of produced ions through one or more accelerating fields;

a first ion drift region for passing accelerated ions;

an ion reflection device within the sealed housing for reflecting ions downstream from the first ion drift region;

a second ion drift region within the sealed housing for passing reflected ions;

the ion reflecting device including (a) one or more electrically charged plates for establishing a first reflecting field to reflect ions of a relatively low energy level, (b) one or more second electrically charged plates for establishing a

second reflecting field to reflect ions of a relatively high energy level, and (c) means for adjusting the second reflecting field independent of the first reflecting field for establishing a substantially uniform flight time through a combination of the one or more accelerating fields, the first and second drift regions, and the reflecting fields; and

an ion detector within the sealed housing downstream from the second ion drift region for detecting ions as a function of time.

5,160,841

ION SOURCE FOR A MASS SPECTROMETER

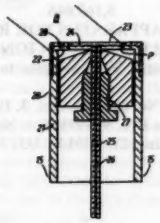
John R. Chapman, and David S. Jones, both of Cheshire, United Kingdom, assignors to Kratos Analytical Limited, Urmston, Manchester, England

Filed Dec. 12, 1991, Ser. No. 805,570

Claims priority, application United Kingdom, Dec. 12, 1990, 9026962

Int. Cl.[5] H01J *49/04*

U.S. Cl. 250—288 **13 Claims**



1. An ion source for a mass spectrometer, comprising a continuous flow probe and means for producing a beam of ionising radiation or particles,

wherein the continuous flow probe comprises means defining a surface so located in relation to the beam producing means as to be exposed to the ionising radiation or particles,

an inlet tube for continuously supplying liquid sample to said surface for exposure to the ionising radiation or particles,

a porous body disposed at the periphery of said surface and being absorbent of sample that has spread to the periphery after being supplied to the surface by the inlet tube,

and means for shielding the porous body from exposure to the ionising radiation or particles.

5,160,842

INFRARED FIRE-PERIMETER MAPPING

David A. Johnson, Jefferson, Oreg., assignor to Mid-Valley Helicopters, Inc., Jefferson, Oreg.

Filed Jun. 24, 1991, Ser. No. 719,843

Int. Cl.[5] G01J *1/00*; G08B *17/12*

U.S. Cl. 250—338.1 **8 Claims**

1. A fire-perimeter, temperature-differentiating mapping system for creating a temperature-level-differentiated, visually readable perimetral outline of a ground fire, with such outline being suitable for in-scale, registered overlay of a related topographic map, said system comprising

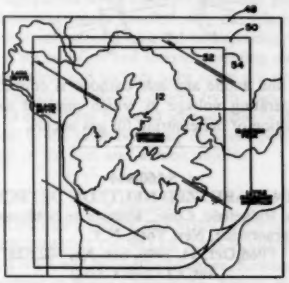
thermal data-acquisition apparatus mountable on a support platform for moving over a ground fire and including means capable of outputting, selectively, different fire-perimeter, thermal-image-data streams which are differentiated by specific isothermal characteristics,

latitude/longitude data-acquisition apparatus also so mountable and including means capable of outputting a latitude/longitude positional data stream, said thermal and latitude/longitude data-acquisition apparatuses being functional simultaneously to acquire time-related and positionally related data,

thermal and latitude/longitude data-recording apparatus also so mountable and including plural recording channels each capable of recording time-synchronous thermal and latitude/longitude data,

means operatively connecting said thermal data-acquisition apparatus, said latitude/longitude data-acquisition apparatus and said data-recording apparatus including switching means interposed the latter and said thermal data-acquisition apparatus operable to direct selectively to different channels different isothermally differentiated, fire-perimeter data streams to different channels,

data reading and analyzing means operatively couplable to said data-recording apparatus for extracting therefrom and analyzing data contained in each of said channels, and being operative, as a consequence of having analyzed such



data, to produce an X-Y graphic-plotter control signal effective to drive such a plotter in a manner causing the same to create a perimetral outline of a fire reflected in the data contained in the channels, with this outline containing line characteristics that are different from one another, with each such line characteristic being specific to a different one of the isothermal characteristics selected for recording in the different channels, and

an X-Y graphic plotter operatively connected to said reading and analyzing means for receiving and responding to a control signal produced by the latter to produce a proper-scale registrable overlay of the perimetral outline of an observed fire, with such outline having said different line characteristics suitable for registered overlaying onto an in-scale, related topographic map.

5,160,843

APPARATUS AND METHOD FOR MEASURING GAS CONCENTRATIONS

Ari Lehto, Helsinki, Finland, assignor to Vaisala Oy, Helsinki, Finland

Filed Jul. 18, 1991, Ser. No. 731,971

Claims priority, application Finland, Aug. 3, 1990, 903858

Int. Cl.[5] H01S *3/22*; G01N *21/35*

U.S. Cl. 250—343 **20 Claims**

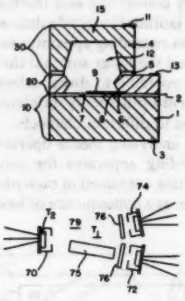
1. An apparatus for measuring the concentration of a gas, said apparatus comprising:

a radiation source for emitting radiation on the gas to be measured, said radiation source further being comprised of

an anode and a cathode, the cathode operates as an electron emitter, and

an emitting fill gas the same as the gas to be measured, and

a radiation detector capable of detecting the radiation transmitted through said gas to be measured, and



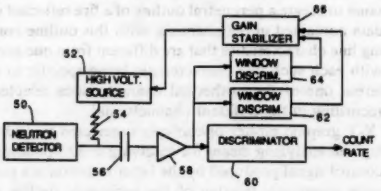
between said anode and said cathode is connected such a low operating voltage at which minimal ionization or dissociation of the emitting fill gas occurs.

5,160,844

GAIN STABILIZED NEUTRON DETECTOR

Paul Albats, Ridgefield, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Oct. 24, 1990, Ser. No. 602,525
Int. Cl.[5] G01T *3/00*
U.S. Cl. 250—390.07 **18 Claims**



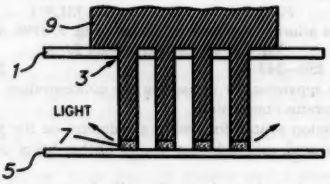
1. An apparatus comprising:
a ^{3}He neutron detector and;
a circuit means connected in a feedback loop to the ^{3}He neutron detector for stabilizing the gain of the ^{3}He neutron detector.

5,160,845

ALIGNMENT TECHNIQUE FOR MASKED ION BEAM LITHOGRAPHY

David P. Stumbo, 1654 Harold St., Houston, Tex. 77006; John C. Wolfe, 5343 Queens Loch, Houston, Tex. 77096, and John N. Randall, 2906 Ambleside, Richardson, Tex. 75082

Filed Mar. 6, 1991, Ser. No. 665,616
Int. Cl.[5] H01V *37/304*
U.S. Cl. 250—491.1 **39 Claims**



1. A method of aligning first and second elements with respect to each other comprising the steps of:

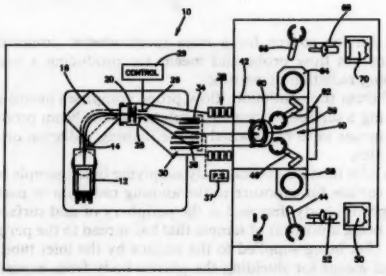
(a) providing said first and second elements which are movable with respect to each other;
(b) providing said first element with alignment marks responsive to radiations impinging thereon to emit electromagnetic radiations;
(c) providing said second element with regions extending therethrough transparent to said radiations;
(d) passing said radiations through said transparent regions to said first element to cause said alignment marks upon which said radiations impinge to emit said electromagnetic radiations
(e) collecting said electromagnetic radiations and transforming said electromagnetic radiations into a signal; and
(f) using said signal to align said first and second elements geometrically with respect to each other.

5,160,846

METHOD AND APPARATUS FOR REDUCING TILT ANGLE VARIATIONS IN AN ION IMPLANTER

Andrew M. Ray, Austin, Tex., assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 592,363, Oct. 3, 1990, abandoned. This application Dec. 9, 1991, Ser. No. 804,484
Int. Cl.[5] H01J *37/317*
U.S. Cl. 250—492.2 **11 Claims**



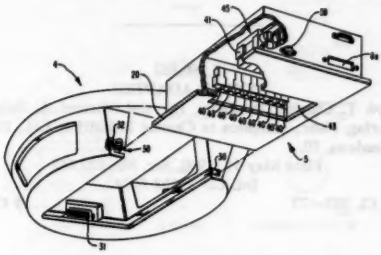
1. An ion beam implant system for controllably treating a generally planar workpiece comprising:
a. source means for providing ions to treat the planar workpiece;
b. support means for orienting the planar workpiece at a location relative the source means;
c. beam forming means for causing ions emitted by the source means to form an ion beam moving in a first trajectory;
d. deflection means for deflecting ions in said ion beam away from said first trajectory by controlled initial deflection amounts along diverging trajectories;
e. a plurality of electrodes bounding an ion beam travel path for setting up a non-uniform static electric field to intercept and redeflect ions moving along said diverging trajectories to redirect ions to impact trajectories that intercept said generally planar workpiece at a uniform, controlled impact angle;
f. control means having an output coupled to said deflection means to adjust the deflecting of said ion beam and thereby control treatment of the generally planar workpiece; and
g. biasing means for maintaining the plurality of electrodes at control voltages for setting up the non-uniform static electric field.

5,160,847

DYNAMIC MULTIVANE ELECTRON ARC BEAM COLLIMATOR

Dennis D. Leavitt, and George A. Takach, Jr., both of Salt Lake City, Utah, assignors to The Parvus Corporation, Salt Lake City, Utah

Filed May 3, 1989, Ser. No. 346,908
Int. Cl.[5] G21K *1/04*
U.S. Cl. 250—505.1 **18 Claims**



1. A dynamic multivane electron arc beam collimator for defining the electron field of an electron beam emitted by a linear accelerator for use in electron arc therapy, said collimator comprising:

(a) a plurality of vanes positioned and adapted to define an electron aperture which defines said electron field,

(b) a plurality of vane movement means associated with said vanes for moving said vanes to dynamically define said electron aperture and to thereby dynamically define said electron field, and

(c) a plurality of local controllers to control said vane movement means through distributed processing;

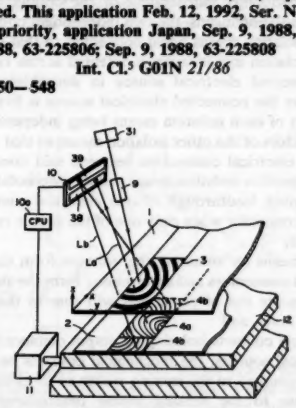
wherein (a), (b) and (c) are adapted to provide vane movement that is independent of the movement of the other vanes and that is capable of movement simultaneous with the movement of the other vanes.

5,160,848

DEVICE FOR DETECTING THE RELATIVE POSITION BETWEEN OPPOSED FIRST AND SECOND OBJECTS

Kenji Saitoh, Yokohama; Masakazu Matsugu, Atsugi, and Naoto Abe, Isehara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 714,351, Jun. 12, 1991, abandoned, which is a continuation of Ser. No. 404,220, Sep. 7, 1989, abandoned. This application Feb. 12, 1992, Ser. No. 832,612
Claims priority, application Japan, Sep. 9, 1988, 63-225801; Sep. 9, 1988, 63-225806; Sep. 9, 1988, 63-225808
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—548 **21 Claims**



1. A device, usable with first and second opposed objects each having at least one diffraction grating, for detecting a positional relationship between the first and second objects in a direction perpendicular to the direction in which the objects are opposed, said device comprising:

light source means for projecting light to a diffraction grating of one of the first and second objects;

first detecting means for detecting a first light spot diffracted by diffraction gratings of the first and second objects, wherein the position of incidence of the first light spot changes with a change in the relative position of the first and second objects in the perpendicular direction;

second detecting means for detecting a second light spot diffracted by diffraction gratings of the first and second objects, wherein the position of incidence of the second light spot changes with a change in the relative position of the first and second objects in the perpendicular direction, the change in the position of incidence of the first and second light spots being different from one another; and

position detecting means for detecting the relative position of the first and second objects, in accordance with the detection by said first and second detecting means;

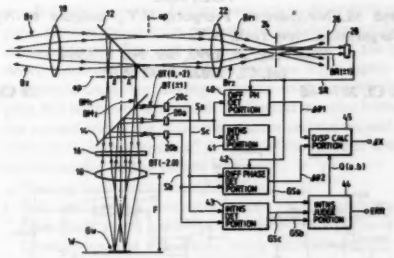
wherein said first and second light spots are produced by light diffracted, at different orders, by the same diffraction grating of one of the first and second objects and by light diffracted, at the same order, by different portions of the other one of the first and second objects.

5,160,849

DIFFRACTION-TYPE DISPLACEMENT DETECTOR FOR ALIGNMENT OF MASK AND WAFER

Kazuya Ota, Tokyo, and Nobutaka Magome, Kawasaki, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Jan. 17, 1991, Ser. No. 642,384
Claims priority, application Japan, Jan. 22, 1990, 2-12322
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—548 **7 Claims**



1. A displacement detector comprising:

beam irradiation means for radiating two beams to a diffraction grating provided on an object from different directions, respectively;

first detection means for detecting first interference radiation between diffracted rays from said diffraction grating in a first direction and having a first diffraction angle, and for outputting a first photoelectric output corresponding to the first interference radiation;

second detection means for detecting second interference radiation between diffracted rays from said diffraction grating in a second direction, and having a second diffraction angle, and for outputting a second photoelectric output corresponding to the second interference radiation;

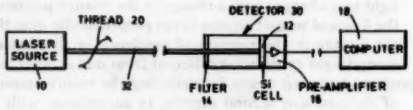
measuring means having a plurality of selectable algorithms for determining displacement of said object relating to a grating pitch direction of said diffraction grating, by using at least one of the first and the second photoelectric outputs; and

selecting means for selecting one of said algorithms on the basis of a comparison of intensities of the first and the second photoelectric outputs.

5,160,850
LIGHT BEAM INTERRUPT DETECTION APPARATUS FOR USE IN A VIBRATING ENVIRONMENT

Walter J. Spirig, 146 King's Road, Pointe-Claire, Province of Quebec, Canada H9R 4H4 , and Jacques Tetrault, St. Eustache, Canada, assignors to Walter J. Spirig, Pointe-Claire, Canada

Filed Jan. 14, 1991, Ser. No. 640,635
Int. Cl.[5] G01N *21/86*; G01V *9/04*
U.S. Cl. 250—561 **20 Claims**



1. A light beam interrupt detection apparatus for use in a vibrating environment comprising:

a light source for producing a beam of light;

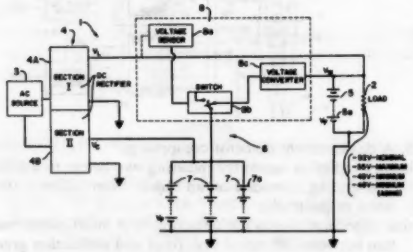
a light receiver for receiving and detecting said beam, said receiver having a detector surface sufficiently larger than said beam such that said beam strikes said detector surface as said beam moves during vibrations: and said receiver producing an output signal which is substantially constant when said beam moves over said detector surface without said beam being broken; and

signal processing means to be connected to said output signal for detecting an interrupt of said beam by an object.

5,160,851
RECHARGEABLE BACK-UP BATTERY SYSTEM INCLUDING A NUMBER OF BATTERY CELLS HAVING FLOAT VOLTAGE EXCEEDING MAXIMUM LOAD VOLTAGE

Joseph M. McAndrews, Freeport, N.Y., assignor to Nynex Corporation, New York, N.Y.

Filed Aug. 28, 1990, Ser. No. 573,994
Int. Cl.[5] H02J *7/00, 9/06*
U.S. Cl. 307—66 **28 Claims**



1. Apparatus comprising:

a back-up battery system for providing back-up power to a switching equipment load, said load receiving power from a primary supply at a nominal load voltage, which is between a maximum load voltage value and a minimum load voltage required so as to avoid disturbances to said load comprising:

one or more first rechargeable batteries, each said first rechargeable battery having cells floated at a given float voltage and being of a number such that the voltage of the first rechargeable battery exceeds the minimum load voltage for a preselected period after the first rechargeable battery is switched in circuit with said load, said preselected period exceeding the period over which the first rechargeable battery reaches an initial minimum voltage, and said cells being further of a number such that the float voltage of the first rechargeable battery exceeds said maximum load voltage;

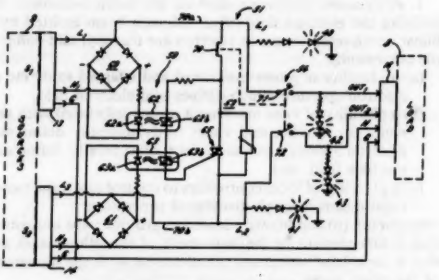
means for sensing the voltage being supplied by said primary supply to said load for selectively switching said one or more rechargeable batteries in circuit with said load upon a given condition of said supplied voltage;

and means for converting the voltage provided by each said one or more first rechargeable batteries to below said maximum load voltage when said first rechargeable batteries are switched in circuit with said load.

5,160,852
POWER ADAPTER

Joseph T. Charles, Inverness, Ill., and Michael A. Reinhart, Gering, Nebr., assignors to Charles Industries, Ltd., Rolling Meadows, Ill.

Filed May 11, 1990, Ser. No. 522,652
Int. Cl.[5] H02J *3/04*
U.S. Cl. 307—77 **9 Claims**



1. An adapter for connecting an electrical load requiring a predetermined voltage level to a pair of electrical sources at a lower voltage level, the adapter serving to sum the sources in a predetermined manner to produce the desired predetermined voltage level output, the adapter comprising in combination:

first and second connectors for connection to the respective electrical sources,

first and second isolation means associated with the first and second connectors, each isolation means including at least two conductors independent of the conductors of the other isolation means, the two independent conductors of each isolation means being connected so that the respective isolation means senses a potential across two lines of a connected electrical source to determine therefrom whether the connected electrical source is live, the conductors of each isolation means being independent of the conductors of the other isolation means so that there is no direct electrical connection between said conductors of the respective isolation means and the two isolation means preventing feedthrough of one electrical source to the other connector when only one of the source connections is made,

sensing means for summing the voltages form the first and second connectors and determining form the sum that the sources are out of phase and will sum to the predetermined level, and

mechanical contacts isolating an output connector from the electrical sources, the mechanical contacts being operatively coupled to the sensing means so as to be closed in response to the sensing means determining that the sources sum to the predetermined level, thereby to couple the sources to the output only when the sources sum to the desired level.

5,160,853

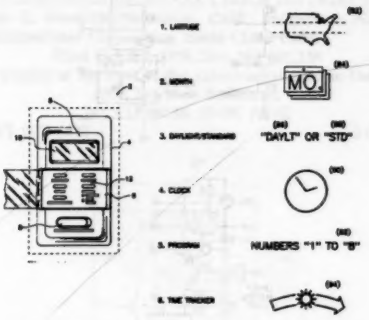
ELECTRONIC TIMER SWITCH WITH TIME TRACKER

Tim Simon, Burlingame, Calif., and Lee Tong, Causeway Bay, Hong Kong, assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 8, 1988, Ser. No. 229,600

Int. Cl.[5] H01H *3/26, 43/00;* **G05B** *11/01;* **H05B** *37/02*

U.S. Cl. 307—140 **9 Claims**



6. A method for controlling a switching of an illumination means, comprising the steps of:

providing a switching apparatus for controlling a power supply coupled to the illumination means in response to a timing control signal;

providing an input device coupled to a microprocessor;

displaying on the input device a representative of a geographical area divided into a plurality of zones;

selecting said geographical information by use of said representation on the input device;

inputting programming information to said microprocessor from said input device;

calculating an effective switching time from said programming information; and

generating said timing control signal by comparing a current time to said effective switching time.

5,160,854

SINGLE-DRIVE LEVEL SHIFTER WITH LOW DYNAMIC IMPEDANCE

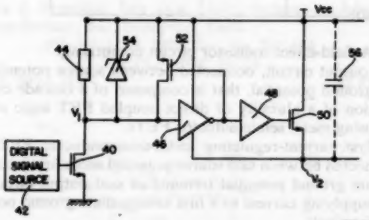
Fabrizio Martignoni, Morazzone; Claudio Diazzi, Milan; Albino Pidutti, Udine, and Fabio Vio, Milan, all of Italy, assignors to SGS-Thomson Microelectronics S.r.l., Milan, Italy

Filed Jul. 24, 1991, Ser. No. 734,911

Claims priority, application Italy, Jul. 27, 1990, 21086 A/90

Int. Cl.[5] H03K *19/0175*

U.S. Cl. 307—264 **19 Claims**



1. A single drive signal level shifter comprising first and second transistors, each having a drain, a gate and a source, said first transistor being a MOS transistor, and said second transistor being a MOS transistor; a signal source, said signal source being connected to the gate of said first transistor; a voltage source and a common terminal; a load element; said first transistor being connected in series with said load element between said voltage source and said common terminal; said second transistor being connected in parallel with said load element; an inverter having an input and an output, the input of said inverter being connected to the connection of said first transistor to said load element; a drive stage having an input and an output, the input of said drive stage being connected to the output of said inverter; the gate of said second transistor being connected to the output of said inverter and a Zener diode connected in parallel with said load element.

5,160,855

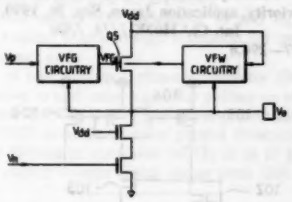
FLOATING-WELL CMOS OUTPUT DRIVER

Daniel W. Dobberpuhl, Shrewsbury, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 723,205, Jun. 28, 1991, abandoned. This application Mar. 11, 1992, Ser. No. 850,248

Int. Cl.[5] H03K *3/01, 17/16*

U.S. Cl. 307—270 **11 Claims**



1. A floating well CMOS output driver comprising:

a. a pull-up transistor having a source-to-drain path and a gate, the source-to-drain path connected at a first end to a supply terminal and connected at a second end to an output terminal;

b. a pull-down transistor having a source-to-drain path and a gate, the source-to-drain path of the pull-down transistor connected at a first end to ground, the gate of the pull-down transistor connected to a negative logic input;

c. a cascode transistor having a source-to-drain path and a gate, the source-to-drain path connected in series between the second end of the pull-up transistor and the second end of the pull-down transistor, the gate of the cascode transistor connected to the supply terminal;

d. a floating well circuit comprising

i. first and second transistors each having a source-to-drain path and a gate, the source-to-drain paths of the first and second transistors being each connected at a first end to the supply terminal, a second end of the source-to-drain paths of the first and second transistors, the gate of the first transistor, and the wells of the first and second transistors each being connected to a floating well circuit output node coupled to the well of the pull-up transistor; and

ii. third and fourth transistors each having a source-to-drain path and a gate, a first end of the source-to-drain path of each of the third and fourth transistors connected to the output terminal, a second end of the source-to-drain path of each of the third and fourth transistors and the gate of the fourth transistor each connected to the floating well circuit output node, the gate of the third transistor connected to the supply terminal; and

e. a floating gate circuit comprising

i. fifth and sixth transistors each having a source-to-drain path and a gate, the source-to-drain paths of the fifth and sixth transistors each connected at one end to a positive logic input, the other end of the source-to-drain paths of the fifth and sixth transistors connected to a floating gate circuit output node which is connected to the gate of the pull-up transistor, the gate of the fifth

transistor connected to the supply terminal, the gate of the sixth transistor connected to the output terminal, and the well of the sixth transistor connected to the floating well circuit output node; and

ii. an seventh transistor having a source-to-drain path and a gate, a first end of the source-to-drain path of the seventh transistor connected to the output terminal, a second end of the source-to-drain path of the seventh transistor connected to the floating gate circuit output node, the gate of the seventh transistor connected to the supply terminal, and the well of the sixth transistor connected to the floating well circuit output node.

5,160,856

REFERENCE VOLTAGE REGULATOR SEMICONDUCTOR INTEGRATED CIRCUIT

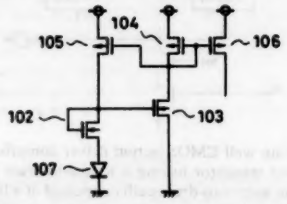
Atsuo Yamaguchi, and Etsushi Takebayashi, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 10, 1991, Ser. No. 683,223

Claims priority, application Japan, Sep. 26, 1990, 2-256320

Int. Cl.[5] H03K *1/14, 1/04*

U.S. Cl. 307—296.8 **10 Claims**



1. A semiconductor integrated circuit with MOS structure, comprising:

an analog circuit; and

a bias circuit, coupled to said analog circuit, for supplying a bias current to said analog circuit, said bias circuit comprising:

a diode formed of first and second islands having opposite types of conductivity in the MOS structure,

a first transistor having its gate and drain coupled together, said first transistor, coupled to said diode in series to form a serial circuit, for providing a voltage,

a second transistor, having its gate coupled to said serial circuit, for generating a constant current in response to said voltage, and

current mirror means, coupled to said second transistor and responsive to said constant current, for feeding back said constant current to said serial circuit and for supplying said constant current as said bias current to said analog circuit.

5,160,857

INTEGRATABLE TRANSISTOR SWITCH UNIT OF THE NTL LOGIC FAMILY

Claude Barre, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jan. 8, 1991, Ser. No. 638,785

Claims priority, application Fed. Rep. of Germany, Jan. 11, 1990, 4000665

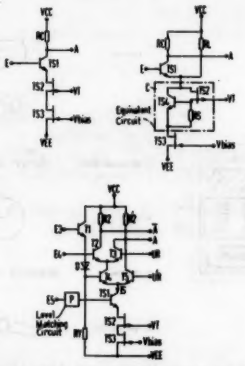
Int. Cl.[5] H03K *19/092, 19/088, 19/094, 19/003, 19/013*

U.S. Cl. 307—446 **11 Claims**

1. An integratable transistor circuit of the NTL non-threshold logic family, comprising:

at least one bipolar transistor having means including collector and emitter resistances for preventing driving of the transistor into saturation, wherein a base of the transistor is connected to a signal input and a collector of the transistor is connected to a signal output, and wherein the collector is connected through the collector resistance to a first constant supply voltage;

said emitter resistance comprising at least first and second MOS transistors connected to form a series circuit, the series circuit being connected to a second constant supply voltage;



a variable supply voltage connected at least to a high impedance gate terminal of one of the first and second MOS transistors; and

a third constant voltage being connected to at least one high-impedance gate terminal of the other of the first and second MOS transistors.

5,160,858

FIELD-EFFECT TRANSISTOR CIRCUIT

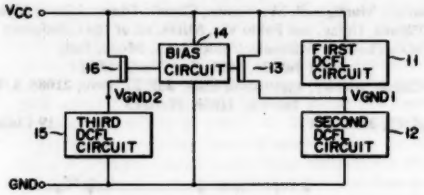
Shigeru Kataoka, Kawasaki, and Shoichi Shimizu, Fujisawa, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 10, 1991, Ser. No. 774,341

Claims priority, application Japan, Oct. 11, 1990, 2-270555

Int. Cl.[5] H03K *19/20*

U.S. Cl. 307—450 **5 Claims**



1. A field-effect transistor circuit comprising:

an output circuit, connected between source potential and ground potential, that is composed of a cascade connection of a plurality of direct coupled FET logic circuits using metal semiconductor FETs;

a first current-regulating metal-semiconductor FET, connected between said source potential and a first intermediate ground potential terminal of said output circuit, for supplying current to a first intermediate ground potential terminal;

a bias circuit, connected between said source potential and said ground potential, for supplying a first bias potential to the gate of said first current-regulating FET; and

a first stabilizing circuit, connected between said source potential and said ground potential and composed of a series connection of an additional direct coupled FET

logic circuit different from said plurality of direct FET logic circuits and a second current-regulating metal-semiconductor FET supplying current to said additional direct coupled FET logic circuit with the gate applied with said first bias potential, for stabilizing said first intermediate ground potential of said output circuit.

5,160,859

SYNCHRONOUS INTERNAL CLOCK DISTRIBUTION

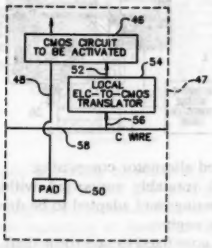
Dennis L. Wendell, Pleasonton, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Oct. 22, 1990, Ser. No. 601,154

The portion of the term of this patent subsequent to Oct. 13, 2009, has been disclaimed.

Int. Cl.[5] H03K *19/00, 19/02*

U.S. Cl. 307—475 **3 Claims**



1. In a BiCMOS integrated circuit having a plurality of bipolar devices and a plurality of CMOS devices, said integrated circuit including a first high-capacitance signal line, a method for providing first and second synchronous clock signals with different signal levels, comprising:

receiving a clock signal in said integrated circuit;

providing a first clock signal, based on said received clock signal, at a first voltage level;

providing said first clock signal to at least said high-capacitance signal line and

receiving said first clock signal form said high-capacitance signal line and translating said first clock signal to at least a second substantially synchronous clock signal, said second clock signal having a voltage level greater than said first voltage level for providing a clock signal to at least a first portion of said plurality of CMOS devices without transmitting said second clock signal over said high-capacitance signal line.

5,160,860

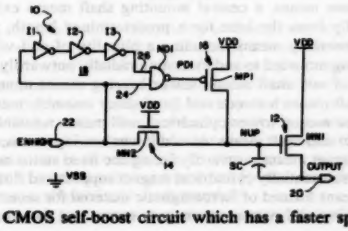
INPUT TRANSITION RESPONSIVE CMOS SELF-BOOST CIRCUIT

Thomas J. Runaldue, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Sep. 16, 1991, Ser. No. 760,414

Int. Cl.[5] H03K *19/94*

U.S. Cl. 307—482 **12 Claims**



8. A CMOS self-boost circuit which has a faster speed of operation and has a higher output voltage level corresponding to a high logic state, comprising:

an input node (22) for receiving an input control signal (ENHIGH) swinging between a lower power supply potential (VSS) corresponding to a low logic level and an upper power supply potential (VDD) corresponding to a high logic level;

a pull-up N-channel transistor (MN1) having its drain connected to said upper power supply potential (VDD), its gate connected to a gate node (NUP) and its source connected to an output node (20);

a self-capacitance (SC) connected across said gate and said source of said pull-up N-channel transistor (MN1);

an N-channel gating transistor (MN2) having its drain-source conduction path connected between said gate node (NUP) and said input node (22) and its gate connected to said upper power supply potential (VDD);

a pull-up P-channel transistor (MP1) having its source connected to said upper power supply potential (VDD), its gate connected to a pull-down node (PD1) and its drain connected to said gate node (NUP);

pulse circuit means (18) responsive to said input control signal making a low-to-high transition for generating a pulse signal; and

the gate of said pull-up P-channel transistor (MP1) being responsive to said pulse signal for pulling up initially said gate node (NUP) close to said upper power supply potential (VDD) in order to cause greater conduction of said pull-up N-channel transistor (MN1) so as to provide the higher output voltage at the output node (20).

5,160,861

CIRCUIT FOR CONTROLLING THE OUTPUT OF A SENSE AMPLIFIER

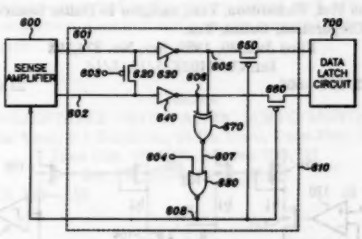
Jeong-Woo Lee, Seoul, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suweon, Rep. of Korea

Filed Jan. 15, 1991, Ser. No. 641,277

Claims priority, application Rep. of Korea, Dec. 28, 1990, 22263/1990

Int. Cl.[5] G11C *7/02*

U.S. Cl. 307—530 **18 Claims**



1. A circuit for controlling the output of a sense amplifier in a semiconductor memory having a sense amplifier for sensing and amplifying the data retrieved from a selected memory cell, and I/O pad and a data latch circuit connected to the I/O pad, comprising:

sense amplifier output detection means for detecting the state of data pairs output from the sense amplifier;

control signal generating means for receiving an address transition detection signal and the output of the sense amplifier output detection means to generate a control signal; and

transfer means connected between the sense amplifier and the data latch circuit, for responding to the output of the control signal generating means;

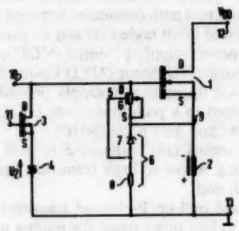
whereby the output of the control signal generating means is fed back to the sense amplifier.

5,160,862

MOSFET SWITCH CIRCUIT FOR PREVENTING THE SWITCH BEING TURNED ON DURING DEACTIVATION OF AN INDUCTIVE LOAD

Ludwig Leipold, Munich, Fed. Rep. of Germany; Hubert Rothleitner, Villach, Austria; Rainald Sander, and Jenoe Tihanyi, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Nov. 6, 1991, Ser. No. 788,594
Claims priority, application European Pat. Off., Nov. 9, 1990, 90121498.1
Int. Cl.[5] H03K *17/687, 17/60*
U.S. Cl. 307—571 3 Claims



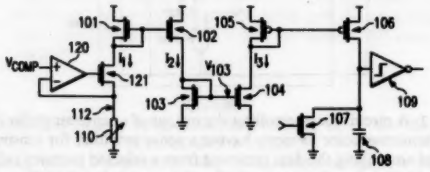
1. A circuit arrangement comprising: a power MOSFET; an inductive load connected between a source terminal of the power MOSFET and a circuit terminal lying at a fixed potential; a series circuit having a Zener diode and a controllable switch, said series circuit being connected between a gate terminal of the power MOSFET and the circuit terminal; a depletion FET connected as a current source between the gate terminal and the source terminal of the power MOSFET, the depletion FET having a saturation current that is lower than a current flowing upon breakdown of the Zener diode and that is higher than reverse current that flows when the Zener diode has not broken down.

5,160,863

DELAY CIRCUIT USING PRIMARILY A TRANSISTOR'S PARASITIC CAPACITANCE

Titkwan Hui, Richardson, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Jun. 30, 1989, Ser. No. 374,198
Int. Cl.[5] H03K *5/13, 5/14*
U.S. Cl. 307—605 23 Claims



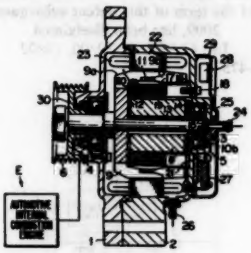
1. An integrated circuit delay line, comprising:
an integration capacitance;
a current source, connected to charge said capacitance;
a reset device, connected to discharge said capacitance when said reset device is turned on; and
a threshold circuit, coupled to said capacitance to provide a digital output signal whenever said capacitance has charged up to a predetermined voltage;
wherein said reset device includes a field effect transistor which is shaped so that a channel region thereof laterally surrounds a first source/drain region thereof,
and wherein said capacitance consists primarily of a parasitic junction capacitance seen at said first source/drain region of said transistor.

5,160,864

OIL-COOLED ALTERNATOR

Akihiro Saito, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 30, 1989, Ser. No. 330,765
Claims priority, application Japan, Apr. 1, 1988, 63-78144
Int. Cl.[5] H02K *9/20*
U.S. Cl. 310—54 12 Claims



1. A oil-cooled alternator comprising:
a rotor shaft rotatably supported within bracket means through bearings and adapted to be driven by an internal combustion engine;
a rotary field core fixed to said rotor shaft and adapted to be excited by a field coil;
a stator core stationarily fixed to inner peripheral surfaces of said bracket means and carrying a stator coil;
oil inlet means provided in said bracket means for allowing oil from oil source means outside said alternator into an interior of said bracket means;
oil passage means provided at said rotary field core and having an inlet end communicating with said oil inlet means through an oil passage formed inside said bracket means, while an outlet end of said oil passage means is opened towards said stator coil;
an oil outlet means provided in a bottom of said bracket means for allowing oil collected in said bracket means to return to said oil source means; and
wherein the oil passage means includes axially extending grooves formed in one of the rotor shaft and a surface of a cylindrical core of the rotor field core facing the rotor shaft.

5,160,865

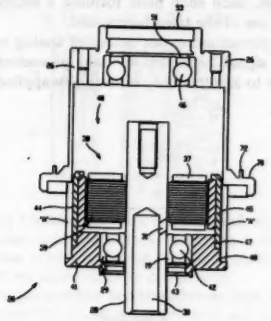
DISK ASSEMBLY WITH THERMALLY ISOLATED IN-HUB SPINDLE MOTOR

Raghuraman Gururangan, San Jose, Calif., assignor to Quantum Corporation, Milpitas, Calif.

Continuation of Ser. No. 620,576, Dec. 3, 1990, abandoned. This application Aug. 23, 1991, Ser. No. 753,003
Int. Cl.[5] H02K *5/00*; G11B *17/14*
U.S. Cl. 310—67 R 7 Claims

1. A disk spindle hub assembly for a rigid disk drive including a base means, a central mounting shaft means extending upwardly from the base for a predetermined length, a fixed stator assembly means including a plurality of coil windings and being mounted to and extending radially outwardly from a region of said shaft means, lower bearing means mounted to said shaft means between said fixed stator assembly means and said base means, lower cylindrical wall means rotatably journalled to said shaft means via said lower bearing means, permanent magnet means outwardly facing the fixed stator assembly means, substantially cylindrical magnet support and flux return path means formed of ferromagnetic material for securing and positioning said permanent magnet means and for containing

and returning magnetic fields therefrom and having a lower annular end region secured to an inner annular region of said lower cylindrical wall means, disk hub means formed of nonferromagnetic material and including a substantially cylindrical body portion having a lower skirt region secured to an outer annular region of said lower cylindrical wall means, the cylindrical body portion and the magnet support and flux return path means defining a continuous, thermally isolating



cylindrical air space extending continuously upwardly from said lower cylindrical wall means and throughout the height dimension of the magnet support and flux return path means, said disk means for mounting at least one data storage disk means and for rotating said data storage disk means in response to rotational force generated by magnetic field interaction between fields of said permanent magnet means and said fixed stator assembly means as driving currents are passed through said coils.

5,160,866

SPINDLE MOTOR

Noriaki Hishida, and Kuniyasu Iwazaki, both of Kyoto, Japan, assignors to Nippon Densan Corporation, Kyoto, Japan

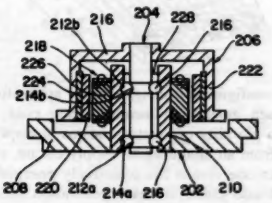
Division of Ser. No. 480,277, Feb. 15, 1990, Pat. No. 5,045,738. This application Jan. 18, 1991, Ser. No. 643,557

Claims priority, application Japan, Feb. 22, 1989, 1-43445; Nov. 25, 1989, 1-36218[U]

The portion of the term of this patent subsequent to Sep. 3, 2008, has been disclaimed.

Int. Cl.[5] H02K *5/16*

U.S. Cl. 310—90 **8 Claims**



1. A spindle motor comprising a fitting member, a shaft member secured to said fitting member, a rotary hub member disposed about said shaft member for carrying a recording disk thereabout and for rotation relative to said shaft member, said rotary hub member comprising a rotary body and an annular member fitted to the inner surface of said body, a rotary magnet fitted to said rotary hub member and a stator positioned in such a manner as to confront said rotor magnet, wherein:

a pair of inner annular grooves are formed directly in the outer surface of said shaft member;

at least one outer annular groove is formed directly in the inner surface of said annular member in such a manner as to confront one of said pair of inner annular grooves;

said pair of inner annular grooves and said outer annular groove define at least one ball-accommodating annular space;

a plurality of ball members are rotatably and movably accommodated in said ball-accommodating annular space.

5,160,867

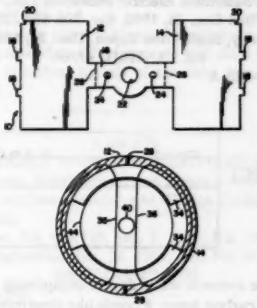
MOTOR FIELD ASSEMBLY

Paul W. Niemela, Pickens, S.C., assignor to Ryobi Motor Products Corp., Easely, S.C.

Filed Nov. 5, 1990, Ser. No. 608,805

Int. Cl.[5] H02K *21/26*

U.S. Cl. 310—154 **2 Claims**



1. A motor field assembly for a permanent magnet motor including a unitary housing shell comprising:

a pair of semi-cylindrical portions positioned in opposition to form a cylindrical shell with two diametrically opposed seams;

a connecting portion joining said pair of semi-cylindrical portions to form a motor housing end wall; and

a pair of annular permanent magnet segments, each of said segments subtending an arc greater than 90° and less than 180° and mounted to the interior of said shell with a central portion of each of said segments spanning a respective seam.

5,160,868

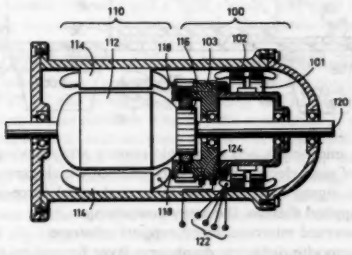
ADJUSTABLE BRUSH AC/DC SERVO MOTOR

Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan

Filed Oct. 19, 1990, Ser. No. 599,742

Int. Cl.[5] H02K *13/10, 23/18*

U.S. Cl. 310—230 **18 Claims**



1. An adjustable-brush electric motor, comprising:

a first rotary electric motor including a drive-shaft wound with a primary armature winding, a commutator mounted

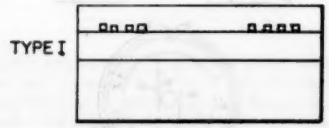
on said drive-shaft and electrically connected to said primary armature winding, a stator wound with a primary field winding for exciting said drive shaft to rotate, and an electrically-adjustable brush assembly for maintaining conductive contact with said commutator during rotation thereof, said electrically-adjustable brush assembly further comprising a second rotary electric motor supported on the drive-shaft of said first electric motor for maintaining an angular displacement of said brush assembly with respect to said commutator to improve electromechanical energy conversion efficiency, reduce sparking at said brush assembly, and to reverse rotation of said drive-shaft.

5,160,869

SURFACE ACOUSTIC WAVE DEVICE

Hideaki Nakahata, and Naoji Fujimori, both of Itami, Japan, assignors to Sumitomo Electric Industries Ltd., Osaka, Japan

Filed Dec. 26, 1990, Ser. No. 634,321
Claims priority, application Japan, Dec. 26, 1989, 1-339521
Int. Cl.[5] H01L *41/08*
U.S. Cl. 310—313 A **12 Claims**



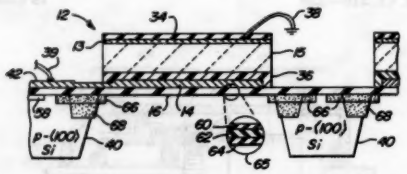
1. A surface acoustic wave device comprising a diamond or diamond-like carbon layer, a comb-like electrode thereon and a ZnO layer formed on the comb-like electrode, which utilizes a zeroth order mode of a surface acoustic wave which is excited in a structure which satisfies ($2\pi H/\lambda$) of the ZnO layer=0.5–1.5, wherein H is a thickness of the ZnO layer and λ is a wavelength of the surface acoustic wave.

5,160,870

ULTRASONIC IMAGE SENSING ARRAY AND METHOD

Paul L. Carson, 5903 Fox Hollow Ct., Ann Arbor, Mich. 48105; Dale W. Fitting, 2785 Heather Rd., Golden, Colo. 80401; Andrew L. Robinson, 2765 Manchester Rd., Ann Arbor, Mich. 48104, and Fred L. Terry, Jr., 1410 Judd Rd., Saline, Mich. 48176

Filed Jun. 25, 1990, Ser. No. 543,267
Int. Cl.[5] H01L *41/08*
U.S. Cl. 310—339 **14 Claims**



1. A micromachined ultrasonic sensing array having a plurality of piezoelectric transducers, each of which generates an electric signal corresponding to a mechanical force acoustically applied thereto, the array comprising:

a patterned micromachined support substrate;

a composite dielectric diaphragm layer formed on the substrate;

a first plurality of electrically conductive plates spaced from one another and connectable to an external bonding pad and resting on the diaphragm layer, each such plate forming a first plate of a distinct one of the transducers;

a plurality of patterned piezoelectric polymer film layers spaced from one another and bonded to the diaphragm layer and the first plurality of electrically conductive plates, said layers of piezoelectric film being responsive to ultrasonic acoustically applied forces;

a second plurality of electrically conductive plates spaced from one another and resting on the piezoelectric polymer film layer, each such plate forming a second plate of a distinct one of the transducers; and

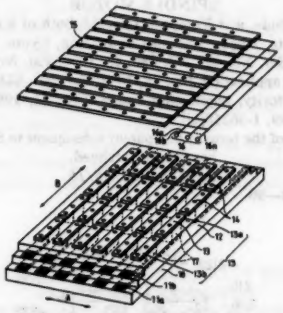
electronic circuit means for detecting analog values of said electric signal generated by said piezoelectric layer in response to an ultrasonic acoustically applied mechanical force.

5,160,871

FLAT CONFIGURATION IMAGE DISPLAY APPARATUS AND MANUFACTURING METHOD THEREOF

Kaoru Tomii, Isehara, and Akira Kaneko, Tokyo, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 12, 1990, Ser. No. 536,849
Claims priority, application Japan, Jun. 19, 1989, 1-156451; Aug. 5, 1989, 1-203382
Int. Cl.[5] G09G *1/04*; H01J *29/70*
U.S. Cl. 315—366 **18 Claims**



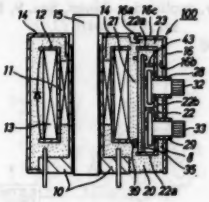
1. A flat configuration image display apparatus comprising electron beam generation means having cold cathodes for generating a plurality of electron beams in response to image signals fed from an image signal supply circuit, electron beam control electrode means for selectively energizing said cold cathodes of said electron beam generation means in accordance with a scanning line selection signal from a selection signal generation circuit, and fluorescent film means having a fluorescent surface which radiates in response to the plurality of electron beams from said electron beam generation means, said electron beam generation means being equipped with at least a plurality of base electrodes extending in a vertical direction of a screen of said image display apparatus, each base electrode including n base electrode segments where n is an integer equal to or greater than 3, and said image signals being independently applied to said n base electrode segments of said electron beam generation means.

5,160,872

FLYBACK TRANSFORMER

Naitou Kenji, Kawaguchi; Ohshima Yasuhiro, Yokohama, and Nagai Tadao, Kawasaki, all of Japan, assignors to Murata Mfg. Col, Ltd., Japan

Filed Aug. 13, 1991, Ser. No. 744,608
Claims priority, application Japan, Aug. 13, 1990, 2-213927
Int. Cl.[5] H01J *29/70*; G09G *1/04*; H05K *5/00*
U.S. Cl. 315—411 6 Claims



1. A flyback transformer with a focus pack mounted on a transformer case, said focus pack arranging a circuit board having a resistor circuit including a variable resistor for focus voltage supply mounted thereon comprising:

an outer case mounted on said transformer case, and an inner frame formed inside and integrally with said outer case for incorporating said circuit board;

an opening path formed between said outer case and said inner frame to be continuous from a side of said inner frame to a bottom thereof;

a shaft hole extending through said outer case and said inner frame,

a retaining cylinder adapted to be inserted into said shaft hole; and

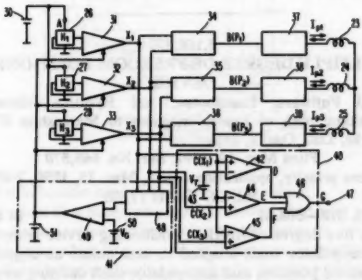
a rotatable operation shaft adapted to be arranged into a cylinder hole.

5,160,873

DRIVING APPARATUS OF A BRUSHLESS MOTOR

Yasutaka Tukiyama, Hirakata; Tadashi Itami, Yonogao; Yosuhiro Okada, Yonago, and Syougo Hamamoto, Yonago, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jul. 26, 1990, Ser. No. 558,859
Claims priority, application Japan, Jul. 26, 1989, 1-195098; Nov. 9, 1989, 1-290051; Jan. 19, 1990, 2-9916
Int. Cl.[5] H02P *7/00*
U.S. Cl. 318—254 12 Claims



1. A brushless motor driving apparatus comprising:

(a) a three-phase commutator-less motor composed of three stator windings and a rotor magnet magnetized in 2n (n being a natural number of 2 or more) magnetic poles for determining the energization to stator windings of said motor on each of said three phases, having a magnetized part of reverse polarity or non-polarity formed in one of said 2n magnetic poles, and three rotational position detecting elements disposed at a spacing of 120 degrees from one another at a position opposite to said rotor magnet, for detecting the position of said magnetized part;

(b) first, second and third amplifiers for amplifying the output signals of said three rotational position detecting elements;

(c) first, second and third subtraction circuits for synthesizing the output signals of said first, second and third amplifiers;

(d) first, second and third current driving circuits for amplifying the currents of said output signals of said first, second and third subtraction circuits, and supplying the respective driving current outputs of said driving circuits to said three phase stator windings of said three-phase commutator-less motor;

(e) a pulse generation circuit for generating one pulse signal per revolution of said three-phase commutator-less motor, on the basis of the output signals of said first, second and third amplifiers; and

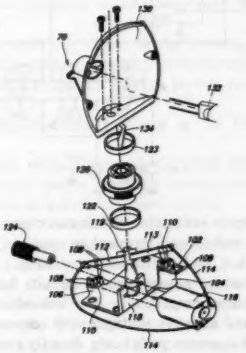
(f) automatic gain control means for automatically controlling the gains of said first, second and third amplifiers, in response to output signals of the first, second and third amplifiers.

5,160,874

ROTATABLE WARNING LIGHT ASSEMBLY

Harold W. Lyons, Killingworth, and James L. Stopa, Old Saybrook, both of Conn., assignors to Whelen Technologies, Inc., Chester, Conn.

Division of Ser. No. 403,710, Sep. 6, 1989, Pat. No. 5,027,260.
This application Jan. 28, 1991, Ser. No. 647,581
Int. Cl.[5] H02P *5/00*
U.S. Cl. 318—268 11 Claims



1. A rotatable warning light assembly comprising:

light generator means, said light generator means including a rotatable reflector and a light source, said light source being supported from said reflector for rotation therewith;

coupling means for delivering electrical and mechanical energy to said light generator means, said coupling means including a drive gear and a pair of electrically conductive slip rings, said coupling means being mechanically connected to said reflector whereby the application of a rotational force to said coupling means will cause rotation of said reflector and light source, said drive gear and slip rings being mounted coaxially and said slip rings being electrically isolated from one another, said coupling means further comprising means electrically connecting said slip rings to said light source;

unitary base means for supporting said light generator means, said base means including spindle means for defining an axis of rotation of said reflector and coupling means, said coupling means being rotatably engaged by

said spindle means and being coaxial therewith, said base means also including a pair of spacially displaced brush holders, said brush holders being respectively juxtapositioned to a said slip ring of said coupling means, said base means further including means for supporting a motor;

motor means, said motor means comprising an electrical drive motor mounted on said motor supporting means, said motor having a rotatable output shaft;

means for converting rotation of said motor output shaft to rotation of said coupling means drive gear about the axis of said spindle means, said translating means including a worm gear driven by said motor output shaft, said worm gear engaging said coupling means drive gear; and

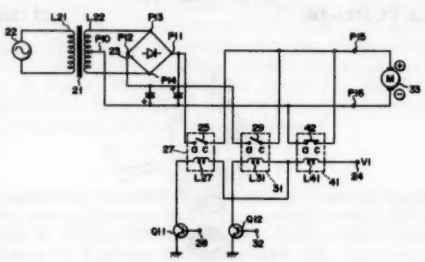
brush means disposed in each of said base means brush holders, said brush means being resiliently biased against respective of said slip rings whereby electrical current may be supplied to said light source via said brush means and slip rings.

5,160,875

DC MOTOR CONTROLLER WITH HIGH RELIABILITY

Mitsunobu Kono, Saitama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 11, 1990, Ser. No. 580,585
Claims priority, application Japan, Sep. 11, 1989, 1-105400[U]
Int. Cl.[5] H02P *3/00*
U.S. Cl. 318—280 **18 Claims**



1. A DC motor controller which can control a DC motor having a first and second terminal to rotate in a forward and reverse direction, said controller comprising:

two independent power source circuits having first and second paths respectively for individually outputting positive and negative voltages with respect to a common path, said common path being directly connected to said second terminal of said DC motor;

a first switch element provided between the first path which outputs the positive voltage and said first terminal of the DC motor;

a second switch element provided between the second path which outputs the negative voltage and said first terminal of the DC motor;

driving means for outputting an ON-OFF control signal for controlling said first and second switching elements to set said first and second switching elements into opposite switching states in response to a forward or reverse rotation instruction for said DC motor, and for outputting an OFF control signal for setting both said first and second switching elements into the OFF state in response to a rotation interruption instruction; and

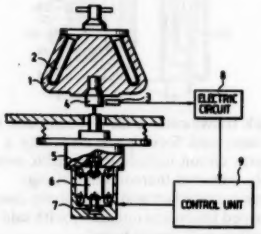
a short circuiting circuit for substantially and directly connecting said first and second terminals of said DC motor to brake the DC motor and interrupt the rotation thereof in response to the rotation interruption instruction.

5,160,876

METHOD OF PROTECTING ROTATING MACHINE

Yoshitaka Niinai, 2-5-1-305, Nagahori-cho, Katsuta-shi, Ibaraki-ken; Norihisa Sagawa, 3271-50, Nakane, both of Katsuta-shi, Ibaraki-ken; Yasuhiro Kawai, 712-1, Takaba, Katsuta-shi, Ibaraki-ken; Sadato Igarashi, 1549-4, Shirakata, Tokai-mura, Naka-gun, Ibaraki-ken, and Hisanobu Ohyama, 1-6-10-103, Nagahori, Katsuta-shi, Ibaraki-ken, all of Japan

Continuation of Ser. No. 404,397, Sep. 8, 1989, abandoned. This application Dec. 14, 1990, Ser. No. 627,903
Claims priority, application Japan, Sep. 9, 1988, 63-226763
Int. Cl.[5] B04B *13/00*
U.S. Cl. 318—460 **9 Claims**



1. Apparatus for controlling a machine having a rotating part driven by a motor shaft comprising a vibration sensor for the rotating part for deriving a signal having an amplitude indicative of vibration of the part, a controller responsive to the amplitude vibration sensor for selectively stopping rotation of the shaft, the controller being arranged so that the shaft rotation is (a) stopped in response to the amplitude of the signal having a predetermined amplitude relation at first and second different displaced time instants and (b) not affected by the vibration sensor in response to (i) the amplitude being less than a predetermined value at one of said instants and (ii) the predetermined amplitude relation occurring at only one of said time instants.

4. A method of controlling a machine having a rotating part driven by a motor shaft comprising sensing vibration of the rotating part, stopping rotation of the part in response to the amplitude of the sensed vibration having a predetermined amplitude relation at a pair of displaced first and second different time instants, and maintaining the rotating speed at a predetermined value in response to the sensed vibration (i) being less than a predetermined value at one of said instants and (ii) the predetermined amplitude relation occurring at only one of said time instants.

5,160,877

MULTIPLE DEGREE-OF-FREEDOM POSITIONING DEVICE

Shigeki Fujiwara, Izumiootsu, and Ryosuke Maruyama, Hirakata, both of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Mar. 14, 1991, Ser. No. 669,570
Claims priority, application Japan, Mar. 15, 1990, 2-65013
Int. Cl.[5] G05D *11/08*
U.S. Cl. 318—568.21 **14 Claims**

1. A five degree-of-freedom positioning device comprising:

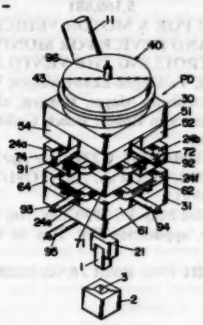
a manipulator shaft adapted to manipulate an object to a desired position, said manipulator shaft defining an axis of said device;

two axially spaced sets of stator magnetic elements including at least one permanent magnet, said two axially spaced sets of stator magnetic elements being cooperative to produce substantially separate magnetic fields extending along the axial direction between said sets of the stator magnetic elements;

two axially spaced sets of electrically energized movable

coils carried on said manipulator shaft and lying substantially in parallel transverse planes between said sets of the stator magnetic elements;

each of said movable coils having the substantial portion interposed between said two axially spaced sets of the stator magnetic elements such that said coils produce



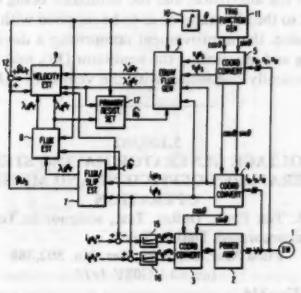
individual coil fields which interact with the corresponding magnetic fields to develop Lorentz forces acting on said manipulator shaft for effecting two translational movement along two mutually orthogonal axes perpendicular to the axis of said manipulator shaft and three rotational movements about the three mutually orthogonal axes.

5,160,878

INDUCTION MOTOR CONTROLLER PROVIDING TEMPERATURE COMPENSATION

Tetsuaki Nagano, Aichi, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan

Filed Dec. 10, 1990, Ser. No. 625,184
Claims priority, application Japan, Dec. 21, 1989, 1-331751
Int. Cl.[5] H02P *5/40*
U.S. Cl. 318—800 **14 Claims**



1. An induction motor controller comprising:

equivalent flux generating means responsive to a set primary resistance value and operative to determine an amount of flux equivalent to a secondary linkage magnetic flux of an induction motor having a vector in the same direction as a torque component of a primary current supplied to said induction motor;

estimated flux generating means for estimating values of the amounts of flux equivalent to the secondary linkage magnetic flux of said induction motor; and

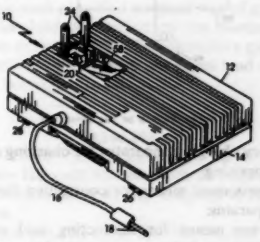
primary resistance setting means for modifying said set primary resistance value of said induction motor in accordance with a difference between the output of said equivalent flux generating means and the output of said estimated flux generating means.

5,160,879

SAFE, RECHARGEABLE, BATTERY-CONTAINING POWER PACK AND METHOD

Angelo Tortola, Lexington, and Donald C. Mifflit, Chelmsford, both of Mass., assignors to Curtis Manufacturing Company, Inc., Jaffrey, N.H.

Filed Oct. 8, 1991, Ser. No. 773,194
Int. Cl.[5] H01M *10/46*
U.S. Cl. 320—2 **14 Claims**



1. An electrically safe, transformerless, rechargeable, battery power pack and apparatus which comprises:

a) a housing:

b) a battery-receiving means in the housing, to receive a rechargeable battery means for periodic recharging and to be used as a source of battery power for an electrical device;

c) a rechargeable battery means in the batter-receiving means;

d) an external, surface-exposed, electrical outlet means, to supply battery power from the battery means to a separate, battery-powered, electrical device;

e) printed-circuit board means in the housing to reduce and rectify AC voltage and to provide reduced DC voltage to recharge the battery means;

f) spaced-apart, first and second, electrical contacts, the first electrical contacts in electrical communication with the battery and the printed-circuit means, and the second electrical contacts in electrical communication with the battery and the external outlet means;

g) an electrical plug means comprising a pair of spaced-apart metal prongs in an insulating body at the one end, the metal prongs adapted to be inserted in an AC power source, and a pair of spaced-apart, electrical contact extensions at the other end; and

h) mounting means to provide for the pivotable movement of the plug means between an outwardly extended, battery-means, rechargeable position, wherein the plug means is adapted to be inserted into an AC power source, to recharge the battery means through the first electrical contacts and the circuit-board means, and wherein, in such position, the electrical output means is electrically isolated by an air gap and a battery-means operating position, wherein the plug means is in electrical contact with the second electrical contacts, the recharged battery means, and with the external outlet means, to provide recharged battery power from the battery means to the external electrical output means.

5,160,880

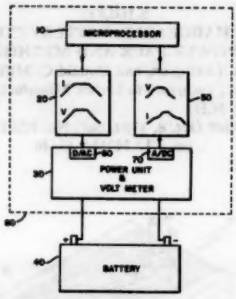
METHOD AND APPARATUS FOR CHARGING AND TESTING BATTERIES

Thirumalai G. Palanisamy, Morristown, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 350,071, May 10, 1989, Pat. No. 5,049,803. This application Jun. 24, 1991, Ser. No. 709,034

Int. Cl.[5] H02J *7/04, 7/10*

U.S. Cl. 320—32 **10 Claims**



BLOCK DIAGRAM OF THE APPARATUS

1. A battery charging apparatus for charging a rechargeable battery, comprising:

(a) microprocessor means for controlling the operations of said apparatus;

(b) software means for instructing said microprocessor means to control the sequence of said operations;

(c) memory means connected to said microprocessor means for storing said software instructions and predetermined data and cell characteristics corresponding to said battery;

(d) digital to analog converter means connected to said microprocessor means for converting digital signals from said microprocessor means to analog signals;

(e) direct current power generator means, connected to said digital to analog converter means for producing controllably varying charging current or voltage to said battery for a predetermined period of time as required by said microprocessor means and for charging said battery automatically with a charge input at any rate until the battery charge voltage equals the estimated number of cells of said battery multiplied by a predetermined voltage which is characteristic of the battery;

(f) a pair of output means of said apparatus, for connection with said battery;

(g) current sensor means, connected to said output means for measuring the current passing through said output means to and from said battery;

(h) voltage measuring means for measuring the voltages of said battery, current sensor and direct current power generator means while said power generator means supplies a controllably varying charging current or voltage and for measuring open circuit voltage of said battery and estimating the number of cells possible for the measured open circuit voltage;

(i) analog to digital converter means, connected to said voltage measuring means, for converting the analog signals from said voltage measurements to digital signals for transmission to said microprocessor;

(j) second software means for analyzing said current and voltages and for determining number of cells, capacity, state of charge and defects in said battery;

(k) actuator means for controlling the electrical circuits connecting said sensors, said direct current power generator means and said battery;

(l) control means coupled to said power generator means for controlling the voltage and current supplied by said power generator means to said battery; and

(m) display means, controlled by said microprocessor means for indicating status of said battery and said apparatus, and advice.

5,160,881

ALTERNATOR FOR A MOTOR VEHICLE HAVING A VENTILATOR AND DEVICE FOR MONITORING AND A CONTROLLING THE VENTILATOR

Guenter Schramm, Vaihingen-Enzweihingen; Walter Kohl, Bietigheim, and Friedhelm Meyer, Illingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

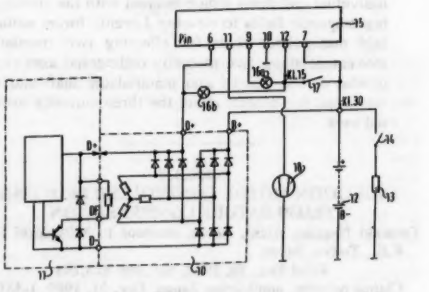
PCT No. PCT/DE90/00367, § 371 Date Apr. 1, 1991, § 102(e) Date Apr. 1, 1991, PCT Pub. No. WO91/02397, PCT Pub. Date Feb. 21, 1991

PCT Filed May 17, 1990, Ser. No. 671,863

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1989, 3925793

Int. Cl.[5] H02H *7/06;* **B60R** *16/02;* **H02K** *9/04, 9/24*

U.S. Cl. 322—7 **12 Claims**



1. In an alternator with a ventilator, particularly a three-phase alternator for a motor vehicle, the ventilator being structured and positioned so as to produce an air flow of the ventilator to cool the alternator, and the ventilator being electrically connected to the alternator so as to be supplied with voltage by the alternator, the improvement comprising a device (15) for controlling and monitoring the ventilator (18), said device (15) being electrically connected with the ventilator (18).

5,160,882

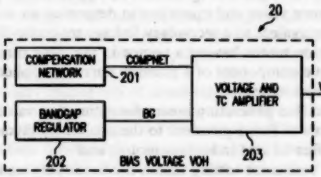
VOLTAGE GENERATOR HAVING STEEP TEMPERATURE COEFFICIENT AND METHOD OF OPERATION

Timothy A. Ten Eyck, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 30, 1990, Ser. No. 502,388

Int. Cl.[5] G05F *3/16*

U.S. Cl. 323—314 **8 Claims**



5. A bias voltage circuit for providing a bias voltage output

controlled as a function of temperature, said circuit comprising:

a bandgap regulator circuit having a voltage output which is constant over a wide temperature range:

a compensation network operative to mimic the voltage/-temperature characteristics of an output circuit connected to the output of said bias voltage circuit, including a current source for maintaining a constant current level for a given supply voltage, and a pair of transistors biased under control of said constant current, said transistors arranged to provide a voltage drop as a function of temperature substantially exactly as produced by transistors connected in the output circuit; and

a circuit for amplifying and mixing the outputs of said bandgap regulator circuit and said compensation network to provide said bias voltage output, including a differential transistor pair coupled between said compensation network and said bandgap regulator circuit, a current mirror pair having one transistor thereof used to set the bias level of said differential transistor pair, a constant current source for maintaining a constant current level for a given supply voltage, and an output emitter follower transistor connected to said constant current source and to the base of a first transistor of said differential transistor pair for providing said bias voltage output at a constant level dependent upon temperature but independent of the number of output circuits connected to said bias voltage circuit.

5,160,883

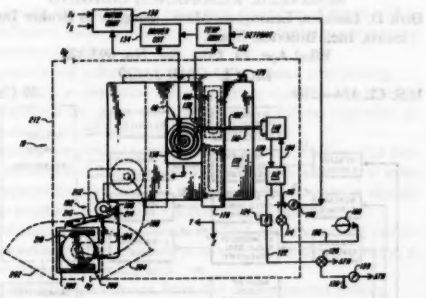
TEST STATION HAVING VIBRATIONALLY STABILIZED X, Y AND Z MOVABLE INTEGRATED CIRCUIT RECEIVING SUPPORT

John H. Blanz, Carlisle, Mass., assignor to John H. Blanz Company, Inc., Carlisle, Mass.

Division of Ser. No. 431,572, Nov. 3, 1989, Pat. No. 5,097,207. This application Jun. 8, 1990, Ser. No. 535,419

Int. Cl.[5] G01R *31/02*; F16C *32/06*; B25B *11/00*

U.S. Cl. 324—158 F **8 Claims**



1. A test station accepting probe cards and testing substrates having plural integrated circuits thereon to be tested that are received for testing on a platform that is movable step-wise in X and in Y to bring the integrated circuit devices individually into operative proximity to the probe cards at different X, Y coordinates, and for holding the platform absolutely stable in Z at any X, Y coordinate, comprising:

a surface plate;

a platform for receiving the substrate to be tested;

an air/vacuum bearing supplied by air at a positive pressure and supplied by vacuum simultaneously at a negative pressure mounted between the platform and the surface plate for allowing the platform to ride on an air bearing in X, and in Y to any X, Y coordinate of the surface plate while air and vacuum are supplied, and for holding the platform absolutely stable in Z when air is not supplied but vacuum is;

wherein said air/vacuum bearing includes a member confronting the surface plate having a substantially flat bearing surface, a central vacuum pad formed in the flat bearing surface, at least three gas-supplied channels formed substantially symmetrically around the vacuum pad, and at least three metered gas-supplied orifices formed in respective ones of the at least three gas channels to provide a preselected, constant rate of gas supply that is independent of bearing load;

wherein vacuum supplied to the vacuum pad draws the bearing to the surface plate while air supplied through the at least three gas-supplied channels pushes the same confronting surface of the surface plate away from the air/-vacuum bearing;

wherein the substantially symmetrical distribution of the gas-supplied channels about the central vacuum pad provides uniform repulsive force about corners of the bearing, while the central vacuum pad provides uniform attractive force, which, in cooperation with the metered orifices that each provide a constant rate of gas supply no matter what load distribution on the bearing might be, enables the air/vacuum bearing to exhibit a gap dimension that is stable against unequal and equal load distributions about the bearing.

5,160,884

CHARGED PARTICLE BEAM DEVICE

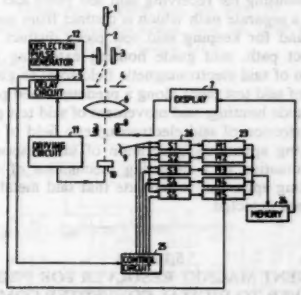
Hideo Todokoro; Hiroyuki Shinada, both of Tokyo, and Satoru Fukuhara, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 29, 1991, Ser. No. 647,423

Claims priority, application Japan, Feb. 2, 1990, 2-21973

Int. Cl.[5] G01R *31/28*

U.S. Cl. 324—158 R **28 Claims**



1. A charged particle beam device for measuring an internal signal waveform of a semiconductor device, comprising:

a means for irradiating a surface of a specimen with a primary, charged particle beam os pulse form, in synchronism with a clock signal, once in each clock period; said clock signal determining an operating period of an internal operating signal of said specimen,

a means for detecting a secondary electron or a reflected electron, said secondary electron or said reflected electron being emitted from said surface of said specimen by irradiating said surface with said primary, charged particle beam of pulse form,

a means for sampling values of a detection signal pulse generated by said detecting means, the sampled values corresponding to a plurality of positions in a range of each detection signal pulse including a peak value of the detected signal pulse, said pulse being generated by said detecting means once in each period of said clock signal, and p1 a means for forming data corresponding to a sum

calculated from sampling values of said plurality of positions.

5,160,885

METAL DETECTING APPARATUS AND APPARATUS INCLUDING GUIDE HOUSING FOR GUIDING A METAL TEST PIECE, FOR TESTING METAL DETECTING APPARATUS

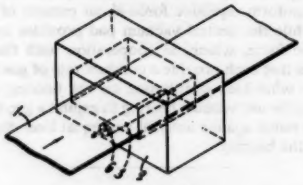
Clifford Hannam, Pulborough, and Gerald A. Harwood, Thetford, both of England, assignors to Hitech Metal Detectors Limited, Shoreham-by-Sea, England

Filed Sep. 12, 1990, Ser. No. 581,554

Claims priority, application United Kingdom, Sep. 15, 1989, 8920957

Int. Cl.[5] G01R *35/00, 33/12;* G01N *27/72*

U.S. Cl. 324—202 **13 Claims**



1. Testing apparatus for testing metal detecting apparatus to enable periodic testing to determine if said metal detecting apparatus having a product path down which a product passes for metal detection, is functioning comprising:

a test piece, capable of movement and formed of representative metal and capable of being passed through a section of an electromagnetic field of said metal detecting apparatus at discrete intervals for generating a response signal by said metal detecting apparatus indicating that metal has been detected, and

a guide housing for receiving said test piece and extending along a separate path which is distinct from said product path and for keeping said test piece distinct from said product path, said guide housing extending through a section of said electromagnetic field so as to guide movement of said test piece along a predetermined path within said guide housing, said movement of said test piece causing distortion of said electromagnetic field of said metal detecting apparatus, generation of said response signal, and actuation of a detecting mechanism of said metal detecting apparatus to indicate that said metal test piece has been detected.

5,160,886

PERMANENT MAGNET RESOLVER FOR PRODUCING A RESOLVER-TO-DIGITAL CONVERTER COMPATIBLE OUTPUT

Eric T. Carlen, Roanoke, Va., assignor to Carlen Controls, Inc., Roanoke, Va.

Filed Feb. 14, 1991, Ser. No. 655,308

Int. Cl.[5] G01B *7/30, 7/14;* G05D *3/00;* H03M *1/48*

U.S. Cl. 324—207.16 **11 Claims**

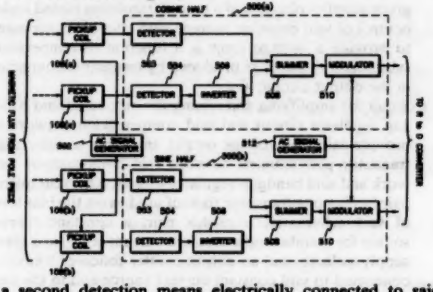
9. A magnetic resolver for measurement of rotary or linear position comprising:

a permanent magnet adapted for translation about a fixed path, said magnet producing a magnet field;

a first coil set disposed adjacent to said permanent magnet for sensing said magnetic field, said first coil set comprising a first magnetic coil and a second magnetic coil, said first and second magnetic coils being positioned relative to said permanent magnet such that said magnetic field is sensed by said second magnetic coil one hundred eighty degrees (180°) out of phase with respect to said first magnetic coil;

an AC signal source electrically connected to said first magnetic coil and said second magnetic coil for exciting said first magnetic coil and said second magnetic coil with an AC signal;

a first detection means electrically connected to said first magnetic coil for sensing a voltage induced across said first magnetic coil to produce a first coil voltage signal and for detecting said first coil voltage signal to produce a first detected signal;



a second detection means electrically connected to said second magnetic coil for sensing a voltage induced across said second magnetic coil to produce a second coil voltage signal and for detecting said second coil voltage signal to produce a second detected signal; and

first differencing means for differencing said first detected signal and said second detected signal to produce a first sinusoidal position signal indicative of the rotary or linear position.

5,160,887

Patent Not Issued For This Number

5,160,888

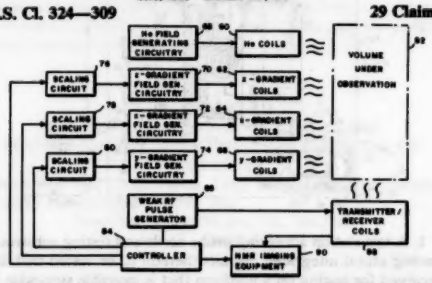
METHOD AND APPARATUS FOR ONE SIDED MAGNETIC RESONANCE IMAGING

Dirk D. Laukien, Lexington, Mass., assignor to Bruker Instruments, Inc., Billerica, Mass.

Filed Apr. 29, 1991, Ser. No. 693,323

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—309 **29 Claims**



1. A one sided nuclear magnetic resonance (NMR) imaging apparatus for imaging a volume under observation which is located on a first side of a planar boundary, comprising;

means for producing a first magnetic field in a first direction which is homogeneous in said volume under observation,

means located on a second side of said planar boundary for producing a second magnetic field which, at said volume under observation, is linearly gradient in at least one direction,

excitation means located on said second side of said planar boundary for producing a magnetic field in said volume under observation in a direction transverse to said first

direction, which field induces NMR of at least one select type of atomic nucleus,

means located on said second side of said planar boundary for receiving a magnetic field signal created by said NMR, and

means for NMR imaging the received magnetic field signal.

5,160,889

MAGNETIC RESONANCE METHOD AND DEVICE FOR ACQUIRING SHORT ECHO TIME IMAGES

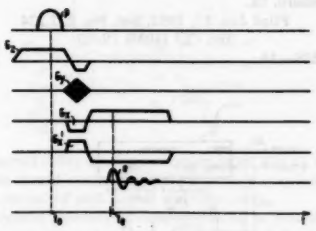
Markus B. Scheidegger, Rüti, and Peter Bösiger, Ennetbaden, both of Switzerland, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 16, 1990, Ser. No. 524,409

Claims priority, application European Pat. Off., Jun. 7, 1989, 89201458.0

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—309 **17 Claims**



1. A magnetic resonance imaging method, in which an object to be imaged is in a stationary homogeneous magnetic field and is subjected to an acquisition sequence for acquiring a magnetic resonance signal, said method comprising:

a) generating a first acquisition sequence comprising:

generating an rf-pulse for exciting atomic spins in the object;

generating a phase encoding gradient;

generating a first reading gradient having a first portion reversed in polarity from a second portion; and

repeating the acquisition sequence a number of times with a different value of the time integral of the phase encoding gradient; and

b) generating a further acquisition sequence comprising:

generating a sequence differing from the first acquisition sequence by generating a reading gradient opposite in polarity to said first reading gradient;

sampling magnetic resonance signals from the first and further acquisition sequences by starting the sampling at least approximately from the maxima of the resonance signals to produce a first and a second set of samples;

combining the samples from the first and second set corresponding to the same value of said time integral to form a reconstructed echo; and

reconstructing an image from the reconstructed echoes.

5,160,890

MAGNETIC RESONANCE EXAMINATION APPARATUS USING A DIELECTRIC RESONATOR

Peter K. H. Roschmann, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corp., New York, N.Y.

Filed Mar. 12, 1991, Ser. No. 667,907

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1990, 4008202

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—314 **23 Claims**

1. A magnetic resonance examination apparatus, comprising:

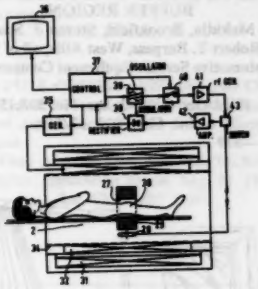
a magnet system for generating a steady magnetic field in an examination space,

a transmitter device for generating an RF field to be superposed on the steady magnetic field in an object to be examined,

means for providing a resonance step-up for the RF field strength active in the object to be examined, and

a device for detecting magnetic resonance signals generated in the object to be examined,

said means for providing including at least one dielectric



resonator which neighbors the object to be examined and which comprises a dielectric having a relative dielectric constant $\epsilon_r > 20$, the dimensions of the at least one dielectric resonator being chosen so that therein, using a neighboring transmitter device, at least one resonance mode can be excited with a frequency which is in the vicinity of the Larmor frequencies to be detected of the nuclei to be excited in the object to be examined.

5,160,891

SURFACE COIL ARRAY RECEIVER

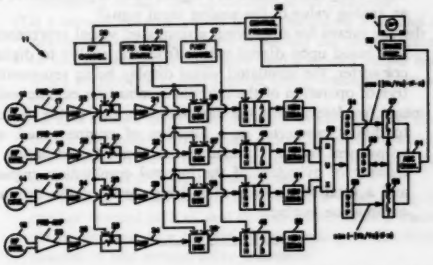
Hanan Keren, Kfar Saba, Israel, assignor to Elscint Ltd., Haifa, Israel

Filed Nov. 7, 1990, Ser. No. 609,779

Claims priority, application Israel, Nov. 30, 1989, 092510

Int. Cl.[5] G01V *3/00*

U.S. Cl. 324—318 **6 Claims**



1. Surface coil receiver circuitry for receiving signals from an array of surface coils in a magnetic resonance system, said circuitry comprising:

a receiver channel for each coil of said array of surface coils,

means for preprocessing said received signals,

said preprocessing means comprising means for converting said received signals to digital signals,

means for multiplexing said preprocessed signals from said receiver channels,

means for providing quadrature components only after the multiplexing by operating on said multiplexed preprocessed signals thereby minimizing the need to balance the circuitry to prevent reflections,

display means,

means for processing said quadrature components to provide image data, and

means for using said image data to provide images on said display means.

5,160,892

ENGINE ANALYZER WAVEFORM DISPLAY WITH A BUFFER REGION

Surender K. Makhija, Brookfield; Steven J. Sparacino, Greenfield, and Robert T. Burgess, West Allis, all of Wis., assignors to Bear Automotive Service Equipment Company, New Berlin, Wis.

Filed Oct. 5, 1990, Ser. No. 593,154
Int. Cl.[5] F02P *17/00*
U.S. Cl. 324—379 22 Claims

1. A display, for an engine test system, comprising:

means for providing a periodic analog input waveform representative of operation of an internal combustion engine, the waveform having a period which varies as a function of the engine speed;

analog to digital converter means for sampling the analog input waveform periodically at a data sampling rate and converting each sample to a digital value representative of an analog value of the analog input signal;

display means for displaying a simulated visual representation based upon digital values from the analog to digital converter, the simulated visual display being representative of operation of the internal combustion engine; and

means for determining the data sampling rate of the analog to digital converter as a function of engine speed, an adjustment factor, a maximum number of data points, a number of cylinders of the internal combustion engine, and a total firing time of a firing cycle of the internal combustion engine.

5,160,893

METHOD OF MEASURING SEMICONDUCTOR LEAD INDUCTANCE BY CHANGING THE DIELECTRIC CONSTANT SURROUNDING THE LEAD

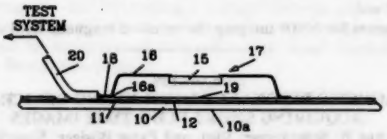
Michael A. Lamson, Van Alstyne, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 24, 1991, Ser. No. 705,475
Int. Cl.[5] G01R *27/26*
U.S. Cl. 324—654 7 Claims

1. A method for improved accuracy of inductance measurements on leads of a circuit board mounted semiconductor device using an inductance test system, comprising the steps of:

attaching a coaxial cable between the test system and the lead to be measured;

connecting the coaxial cable to the lead and to a ground plane on the circuit board;



changing the dielectric constant around the lead; and

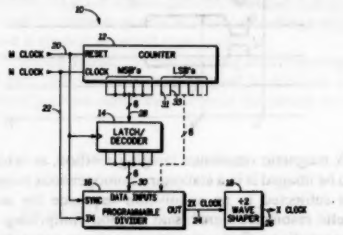
measuring the inductance of the lead.

5,160,894

DIGITAL FREQUENCY SYNTHESIZER AND METHOD OF FREQUENCY SYNTHESIS

Alan L. Westwick, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 17, 1992, Ser. No. 822,224
Int. Cl.[5] H03B *19/00*
U.S. Cl. 328—14 20 Claims



1. A frequency synthesizer comprising:

a counter having a reference clock input for receiving a reference clock signal, a system clock input for receiving a system clock signal which has a frequency which is externally controlled to be within a predetermined range of frequencies greater than a frequency of the reference clock signal and which has operational error, and an output for providing a count output signal;

means for storing coupled to the counter, for storing a predetermined portion of the count output signal; and

means for dividing coupled to the means for storing, the means for dividing receiving and dividing the system clock by a divisor determined by the predetermined portion of the count output signal to provide a synthesized output frequency signal of predetermined constant frequency regardless of variation of the system clock within the predetermined range of frequencies.

5,160,895

MMIC AMPLIFIER WITH EXTENDED DYNAMIC RANGE AND LOW DISTORTION

Ronald T. Siddoway, and Vaughn H. Estrick, both of Fullerton, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 11, 1991, Ser. No. 684,080
Int. Cl.[5] H03F *1/32*
U.S. Cl. 330—151 1 Claim

1. A monolithic integrated circuit amplifier with extended dynamic range and low distortion comprising:

a) an input element for receiving a microwave input signal;

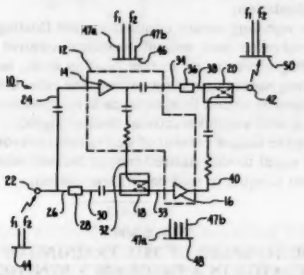
b) a power amplifier having an input and an output, the input of the power amplifier being coupled to receive said microwave input signal;

c) a first delay device having an input and an output, the

input of said first delay device being coupled to receive said microwave input signal;

d) a first directional coupler having a first input and a second input and an output, said first directional coupler effectively subtracting a signal received on the second input from a signal received on the first input, said first directional coupler being coupled to receive the output of the power amplifier on the first input and to receive the output of said first delay device on the second input;

e) a distortion amplifier having an input and an output, the input of the distortion amplifier being coupled to receive the output of said first directional coupler;



f) a second delay device having an input and an output, the input of said second delay device being coupled to receive the output of said power amplifier; and

g) a second directional coupler having a first input and a second input and an output, said second directional coupler effectively subtracting a signal received on the second input from a signal received on the first input, said second directional coupler being coupled to receive the output of the power amplifier on the first input and to receive the output of said distortion amplifier on the second input; and

g) an output element coupled to the output of said second directional coupler for providing the output of said monolithic integrated circuit amplifier.

5,160,896

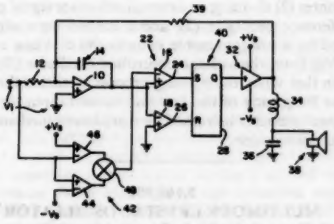
CLASS D AMPLIFIER

David P. McCorkle, Carmel, Ind., assignor to Harman International Industries, Incorporated, Northridge, Calif.

Filed Feb. 18, 1992, Ser. No. 837,166

Int. Cl.[5] H03F *3/38*

U.S. Cl. 330—251 **23 Claims**



21. In a hysteresis-type pulse width modulator for converting an input voltage into a pulse width modulated waveform, the width of the pulses of which is related to the input voltage amplitude, the modulator comprising a window comparator, a supply voltage source having a pair of terminals across which a supply voltage is provided, and a hysteresis voltage source having a pair of terminals across which a hysteresis voltage is provided, the improvement wherein the hysteresis voltage source comprises a multiplier, means for adding the supply voltage and input voltage to generate a sum voltage, means for subtracting the input voltage from the supply voltage to generate a difference voltage, means for coupling the input voltage to the sum voltage generating means and difference voltage generating means, means for coupling the supply voltage source to the sum voltage generating means and difference voltage generating means, means for coupling the sum voltage generating means and difference voltage generating means to the multiplier, and means for coupling the multiplier to the window comparator.

5,160,897

PUSH-PULL POWER AMPLIFYING CIRCUIT

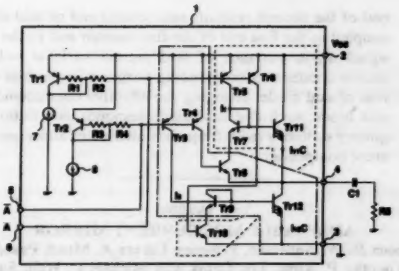
Masanori Fujisawa, Kumagaya, and Kenichi Kokubo, Tatebayashi, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Aug. 29, 1991, Ser. No. 751,949

Claims priority, application Japan, Aug. 30, 1990, 2-230433

Int. Cl.[5] H03F *3/30*

U.S. Cl. 330—274 **5 Claims**



1. A push-pull power amplifying circuit, comprising:

(A) a first drive transistor for amplifying a first input signal;

(B) a second drive transistor for amplifying a second input signal;

(C) a first current mirror circuit including a first diode-connected transistor for receiving the output current from said first drive transistor, and a first output transistor connected to said first diode-connected transistor;

(D) a second current mirror circuit including a second diode-connected transistor for receiving the output current of said second drive transistor, and a second output transistor connected to said second diode-connected transistor;

(E) a first control means for ON-OFF controlling the emitter current path of said second diode-connected transistor in response to a current corresponding to the output current of said first drive transistor; and

(F) a second control means for ON-OFF controlling the emitter current path of said first diode-connected transistor in response to a current corresponding to the output current of said second drive transistor.

5,160,898

POWER AMPLIFIER

Gregory R. Black, Vernon Hills, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 3, 1991, Ser. No. 709,733

Int. Cl.[5] H03G *3/30*

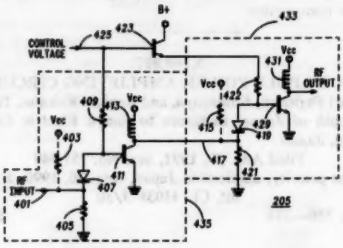
U.S. Cl. 330—284 **2 Claims**

1. A radio frequency amplifier including a transistor, at least a first and a second resistor, the amplifier having a first signal input and a first signal output, the first resistor having a first and a second end, the second end coupled to an electrical ground, the transistor having a base, an emitter and a collector, the emitter coupled to an electrical ground, the collector cou-

pled to the first output signal, the base coupled to a first end of the second resistor, the radio frequency amplifier comprising:

a second variable voltage source coupled to a second end of the second resistor; and

a diode having a first and a second end, said first end an anode, said second end a cathode, said first end of said diode coupled to the base of the transistor and to the first



end of the second resistor, said second end of said diode coupled to the first end of the first resistor and to the first signal input, variance of said second variable voltage source creates a corresponding variance in the bias current of said diode, changing the effective conductance of said diode, such that said diode responds as a radio frequency switch, a radio frequency attenuator and a temperature compensator.

5,160,899

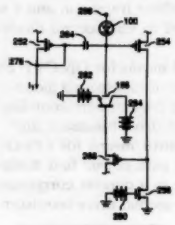
ADAPTABLE MOS CURRENT MIRROR

Janeen D. W. Anderson, Fremont; Carver A. Mead, Pasadena; Timothy P. Allen, Los Gatos, and Michael F. Wall, Sunnyvale, all of Calif., assignors to Synaptics, Incorporated, San Jose, Calif.

Continuation of Ser. No. 525,764, May 18, 1990, Pat. No. 5,059,920, which is a continuation-in-part of Ser. No. 486,336, Feb. 28, 1990, Pat. No. 5,068,622, which is a continuation-in-part of Ser. No. 282,176, Dec. 9, 1988, Pat. No. 4,935,702. This application Oct. 22, 1991, Ser. No. 781,503

Int. Cl.[5] H03F *3/16;* **H03K** *5/153*

U.S. Cl. 330—288 **5 Claims**



1. An adaptable MOS current mirror fabricated on a semiconductor substrate, said adaptable MOS current mirror having an input node and an output node and including:

first and second MOS transistors, each having a source, a gate, and a drain;

a first MOS capacitor having first and second electrodes;

the source of said first MOS transistor being connected to a source of fixed voltage, the gate and drain of said first MOS transistor being connected to said input node and to said first electrode of said first MOS capacitor, the source of said second MOS transistor being connected to a source of fixed voltage, the gate of said MOS transistor comprising a floating node connected to said second electrode of said first capacitor, the drain of said second MOS transistor forming said output node;

means for generating a first electrical control signal;

electron removal means coupled to said floating node and responsive to said means for generating said first electrical control signal, for removing electrons from said floating node, said electron removal means operating to vary the rate of removal of electrons from said floating gate in response to the magnitude of said first electrical control signal;

means for selectively supplying a calibration current to said input node during adaptation;

means for generating a second electrical control signal during adaptation;

electron injecting means coupled to said floating node and responsive to said second electrical control signal for injecting electrons on to said floating node, said electron injecting means operating to vary the rate of injection of electrons on to said floating node in response to the magnitude of said second electrical control signal;

whereby the output current of said current mirror is adapted to be equal to said desired output current when its input current is equal to said calibration current.

5,160,900

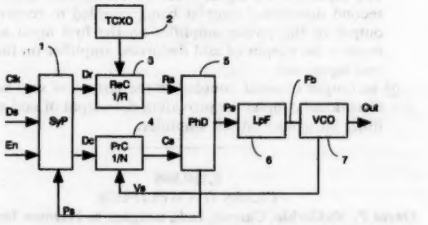
METHOD TO SPEED UP THE TRAINING OF A SHIFT OSCILLATOR IN A FREQUENCY SYNTHESIZER

Pauli Visuri, Paimio, Finland, assignor to Nokia Mobile Phones Ltd., Salo, Finland

Filed Jan. 21, 1992, Ser. No. 824,812

Int. Cl.[5] H03L *7/10, 7/18*

U.S. Cl. 331—18 **10 Claims**



1. Method to speed up the training of the output frequency signal (Out) of a frequency synthesizer circuit comprising a voltage controlled oscillator (7) controlled by a filtered (6) feedback signal (Fb) output by a phase detector circuit (5) having a first input signal (Rs), which is produced by a reference counter (3) dividing an external reference signal produced by a reference oscillator (2), and a second input signal (Cs) produced by a programmable counter (4) dividing an output signal (Vs) from the voltage controlled oscillator (7), characterized in that when the training process is started the internal reference frequency of the first and second input signals (Rs, Cs) is simultaneously increased by a predetermined amount for a predetermined time.

5,160,901

MULTIMODE CRYSTAL OSCILLATOR

Charles S. Stone, Cedar Park, Tex., assignor to Frequency Electronics, Inc., Mitchel Field, N.Y.

Filed Sep. 13, 1990, Ser. No. 581,672

Int. Cl.[5] H03B *5/36, 21/01, 25/00*

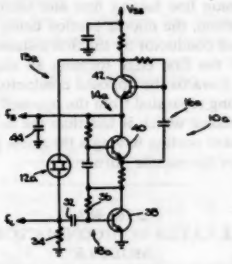
U.S. Cl. 331—37 **16 Claims**

14. A multimode oscillator comprising:

a multimode resonator capable of being excited in first and second modes simultaneously;

a circuit coupled to said resonator for exciting said resonator in said first and second modes simultaneously, said circuit

including elements coupled in a single gain feedback loop coupled to said resonator for causing said oscillator to oscillate at a first frequency corresponding to said first



mode and at a second frequency corresponding to said second mode simultaneously, said elements including a non-linear active element and a substantially linear amplifier and not including an inductor.

5,160,902

VOLTAGE CONTROLLED OSCILLATOR WITH CONTROLLED CAPACITANCE RATIO IN POSITIVE FEEDBACK LOOP TO BROADEN BANDWIDTH

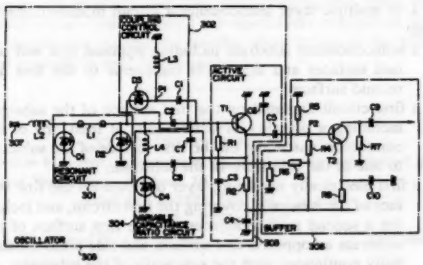
Hiroshi Saeki, Atsugi, and Hatsuo Motoyama, Tokyo, both of Japan, assignors to Anritsu Corporation, Tokyo, Japan

Division of Ser. No. 570,048, Aug. 20, 1990. This application Jul. 9, 1991, Ser. No. 727,839

Claims priority, application Japan, Aug. 25, 1989, 1-217261; Sep. 21, 1989, 1-243434; Sep. 25, 1989, 1-246532; Mar. 30, 1990, 2-83049

Int. Cl.[5] H03B 5/00

U.S. Cl. 331—117 R 9 Claims



1. A voltage controlled oscillator comprising:

resonant circuit means having at least a coil and a first variable capacitance diode, and for resonating within predetermined variable frequency ranges;

active circuit means having an input, an output, and an active element connected between said input and said output, said input being connected to said resonant circuit means in order to receive a resonant output therefrom;

variable capacitance ratio means having a second variable capacitance diode and at least one capacitor and connected in a positive feedback manner between said input and said output of said active circuit means in order to oscillate said active element of said active circuit means at a resonant frequency of said resonant circuit means; and

variable control means for changing a resonant frequency of said resonant circuit means to thereby apply a control voltage to said first and second variable capacitance diodes and for controlling a capacitance ratio between said at least one capacitor and said second variable capacitance diode in said variable capacitance ratio means, so that an oscillator frequency of said active element can be changed substantially linearly over a wide bandwidth of no less than one octachord in accordance with a variation in said control voltage, to thereby retain the amount of positive feedback at a predetermined level against the oscillator frequency of said active circuit means.

5,160,903

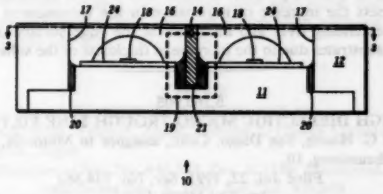
HIGH ISOLATION PACKAGING TECHNOLOGY

Richard S. Torkington, Mesa, and David G. Lamoreaux, Tempe, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 3, 1990, Ser. No. 620,878

Int. Cl.[5] H05K 9/00

U.S. Cl. 333—12 9 Claims



1. A gap-less package to provide isolation between signals on microstrip circuitry at microwave frequencies without gaskets, the package comprising:

a single-piece baseplate of metal with at least one channel the baseplate including printed microwave circuitry laminated to microstrip board material;

a single-diece framework, wherein the framework comprises at least one isolation structure mating to the at least one channel the at least one isolation structure for electromagnetically isolating at least one of the printed microwave circuitry; and

solder coupling the baseplate to the framework.

5,160,904

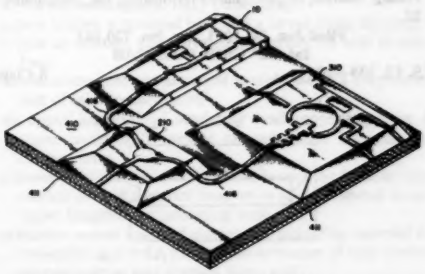
MICROSTRIP CIRCUIT WITH TRANSITION FOR DIFFERENT DIELECTRIC MATERIALS

Richard W. Babbitt, Fair Haven, and Richard A. Stern, Allenwood, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 7, 1991, Ser. No. 789,207

Int. Cl.[5] H01P 5/00

U.S. Cl. 333—34 1 Claim



1. A composite microstrip circuit comprising:

a base of dielectric material with a predetermined dielectric constant, the base having a top and bottom surface;

a plurality of substrates with predetermined dielectric constants higher than the dielectric constant of the base, the plurality of substrates having top, bottom, and edge surfaces wherein each of the edge surfaces of each of the

substrates tapers linearly from the bottom surface of the substrate to a predetermined height and connects to the top surface of the substrate thereby causing a linear increase in thickness of each of substrates, the plurality of substrates mounted on the top surface of the base such that the top surface of the base abuts the bottom surface of each substrate, thereby forming a substrate-base junction;

a plurality of discrete microstrip components mounted on the top surface of the plurality of substrates; and

a plurality of microstrip transmission lines electrically connecting the discrete microstrip components in a predetermined manner wherein the microstrip transmission lines connected to the microstrip components electrically extend over and mount onto the top and edge surfaces of the plurality of substrates and the top surface of the base,

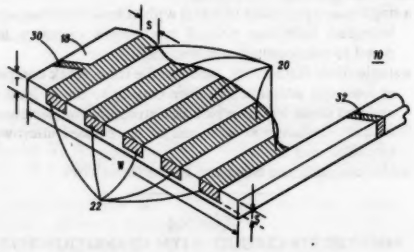
whereby the higher dielectric constant of the substrate offsets the increase of impedance in the transmission lines extending over and mounted on the edge surface of the substrates due to the increase in thickness of the substrate.

5,160,905

HIGH DIELECTRIC MICRO-TROUGH LINE FILTER

Truc G. Hoang, San Diego, Calif., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 22, 1991, Ser. No. 734,382
Int. Cl.[5] H01P *1/203*
U.S. Cl. 333—204 **18 Claims**



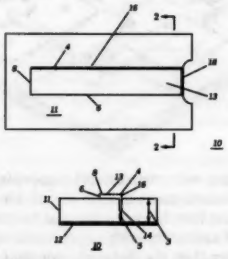
15. The filter of claim 13 where said output terminal means is a screen-printed conductive pattern on said dielectric substrate.

5,160,906

MICROSTRIPE FILTER HAVING EDGE FLARED STRUCTURES

John R. Siomkos, Royal Palm Beach, Fla., and Philip M. Huang, Sunrise, Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 24, 1991, Ser. No. 720,143
Int. Cl.[5] H01P *1/203, 7/08*
U.S. Cl. 333—204 **8 Claims**



1. A transmission line resonator structure comprising:

a dielectric substrate having first and second opposing sides, the first and second opposing sides being separated by a first distance;

a transmission line disposed on the first side; and

an opposed conductor disposed on the second side;

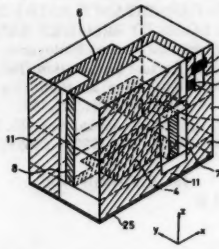
the transmission line having first and second edges and a middle portion, the middle portion being separated from the opposed conductor by the first distance, and at least a portion of the first edge forming an elongated portion extending towards the opposed conductor, the elongated portion being separated from the opposed conductor by a second distance which is less than the first distance, and the elongated portion having a thickness greater than the thickness of the middle portion.

5,160,907

MULTIPLE LAYER SEMICONDUCTOR CIRCUIT MODULE

Yasuharu Nakajima, and Akira Inoue, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 30, 1991, Ser. No. 753,049
Claims priority, application Japan, Sep. 3, 1990, 2-234097
Int. Cl.[5] H01P *3/08*
U.S. Cl. 333—246 **21 Claims**



1. A multiple layer semiconductor circuit module comprising:

a semiconductor substrate including opposed first and second surfaces and side walls transverse to the first and second surfaces;

a first circuit disposed on the first surface of the substrate including a plurality of conductors, at least one of the conductors extending on the first surface of the substrate to one of the side walls of the substrate;

a first electrically insulating layer disposed on the first surface of the substrate, covering the first circuit, and including a second surface adjacent to the first surface of the substrate an opposed first surface, and side walls substantially continuous with the side walls of the substrate;

a second circuit disposed on the first surface of the first electrically insulating layer including a plurality of conductors, at least one of the conductors extending on the first surface of the first insulating layer to one of the side walls of the first insulating layer;

a second electrically insulating layer disposed on the first surface of the first electrically insulating layer, covering the second circuit, and including a second surface adjacent to the first surface of the first electrically insulating layer an opposed first surface, and side walls substantially continuous with the side walls of the insulating layer;

a third circuit disposed on the first surface of the second electrically insulating layer including a plurality of conductors, at least one of the conductors extending on the first surface of the second insulating layer to one of the side walls of the second insulating layer; and

at least one electrical conductor disposed on at least one of the side walls of the substrate and the first and second electrically insulating layers electrically interconnecting the first, second, and third circuits.

5,160,908

CIRCUIT BREAKER ACTUATING DEVICE

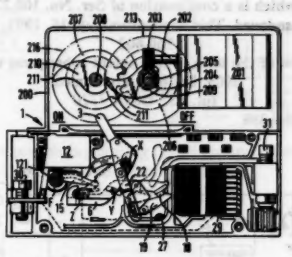
Malcolm H. Mullins, Willingham, and Frank Latham, Redbourn, both of England, assignors to M.K. Electric Limited, London, Great Britain

Filed Feb. 6, 1991, Ser. No. 651,443

Claims priority, application United Kingdom, Aug. 30, 1990, 9018911

Int. Cl.[5] H01H *3/00*

U.S. Cl. 335—68 8 Claims



1. The combination of a circuit breaker comprising a manually operable member which is angularly displaceable about an axis through a top dead centre (TDC) position between two extreme positions towards which it is urged by biasing means after passing through the TDC position to produce a toggle or snap action effect, the member in one extreme position causing or allowing a movable contact to engage another contact and in the other extreme position causing or allowing the moving contact to disengage the other contact, and an actuating device comprising an electric motor operable simultaneous to displace a pair of actuating arms in opposite directions, one actuating arm being displaced along a path in which it is operatively engageable with the member to displace the member about its axis in one direction and the other actuating arm being displaced along a path in which it is operatively engageable with the member to displace the member about its axis in the direction opposite to said one direction.

5,160,909

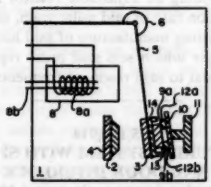
STATE INDICATING RELAY

Chester H. Crow, Schaumburg, Ill., assignor to Appliance Control Technology, Addison, Ill.

Filed Jul. 5, 1991, Ser. No. 726,264

Int. Cl.[5] H01H *67/02*

U.S. Cl. 335—128 11 Claims



1. A state indicating relay including:

an electromagnet, a stationary switching contact, a movable switching contact, a backstop controlling the limit of movement of said movable switching contact in a direction away from said electromagnet, the improvement comprising:

an insulator mounted on said moving contact;

a pair of signal contacts insulated from each other mounted on said backstop;

a bridging contact secured to said insulator, being insulated from said movable switching contact;

operation of said electromagnet moving said movable switching contact in a direction toward and into contact with said stationary switching contact, or in the alternative moving said movable switching contact away from said stationary switching contact breaking contact between said stationary and movable switching contacts;

said bridging contact, in response to movement of said movable switching contact moving toward said stationary switching contact, breaking electrical contact between said signal contacts, and presenting an infinite impedance between said signal contacts, or in the alternative in response to said movable switching contact being moved away from said stationary switching contact, moving said bridging contact into contact with said signal contacts, establishing a zero impedance condition between said signal contacts.

5,160,910

ELECTROMAGNETIC RELAY

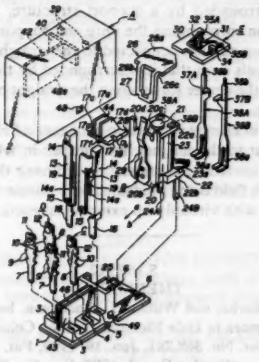
Hideaki Tsuji, Yamaga, Japan, assignor to Omron Corporation, Kyoto, Japan

Continuation of Ser. No. 446,535, Dec. 6, 1989, abandoned. This application Jun. 6, 1990, Ser. No. 533,945

Claims priority, application Japan, Dec. 9, 1988, 63-160721[U]; Dec. 9, 1988, 63-160722[U]; Dec. 13, 1988, 63-162112[U]; Dec. 13, 1988, 63-162113[U]

Int. Cl.[5] H01H *67/02*

U.S. Cl. 335—129 14 Claims



1. An electromagnetic relay comprising:

a case having a terminal base and a cover fitted thereon;

a pair of contact units arranged laterally on said terminal base;

an electromagnet unit arranged in said case on a longitudinal end of said contact units;

an upper longitudinal insulating wall projecting from an upper inner wall surface of said cover between said contact units.

a lower longitudinal insulating wall projecting from an inner surface of said terminal base so as to correspond to said upper longitudinal insulating wall;

actuation means made of electrically insulating material for transmitting a drive force of an armature of said electromagnet unit to said contact units; and

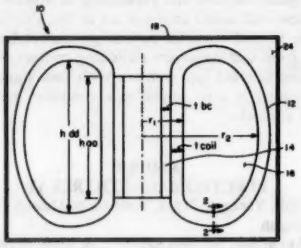
guide means defined between a lower end of said upper longitudinal insulating wall and an upper end of said lower longitudinal insulating wall for guiding said actuation means longitudinally between said upper and lower longitudinal insulating walls as it is actuated by an armature of said electromagnet unit to actuate said contact units between two different states thereof.

5,160,911

TOROIDAL CONSTANT-TENSION SUPERCONDUCTING MAGNETIC ENERGY STORAGE UNITS

J. Stephen Herring, Idaho Falls, Id., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 26, 1990, Ser. No. 605,097
Int. Cl.[5] H01F 7/22
U.S. Cl. 335—216 **8 Claims**



1. A superconducting magnetic energy storage unit comprising:

a) a plurality of constant tension superconducting magnets toroidally wound, the magnets including substantially D-shaped coils having a straight back section and an inner bore, and connected together to form a substantially cylindrical unit, the magnets each including: superconducting wire surrounded by a support structure; and electrical insulation surrounding the wire and support structure;

b) a bucking column connected to the straight back section of the coils such that it is surrounded by the magnets for bearing the center force along the straight back section of the coils,

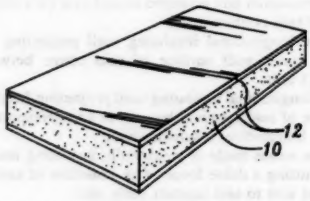
and wherein energy is stored in a magnetic field by applying a current to the magnet, and further in which energy is withdrawn from the magnet by reducing the current, the magnetic field being contained only within the bore of the magnet with virtually no external magnetic field.

5,160,912

THERMISTOR

Francis M. Burke, and William L. Buchanan, both of El Paso, Tex., assignors to Dale Electronics, Inc., Columbus, Nebr.

Division of Ser. No. 368,281, Jun. 19, 1989, Pat. No. 4,993,142. This application Sep. 7, 1990, Ser. No. 579,362
Int. Cl.[5] H01C 7/10
U.S. Cl. 338—22 R **5 Claims**



1. A thermistor, comprising,

an elongated ceramic monolithic thermistor body being free from internal electrodes, and having an outer surface and opposite ends,

a dielectric envelope encapsulating the outer surface of said body,

and conductive terminal caps on the end of said body in electrical contact only with the ends of said body,

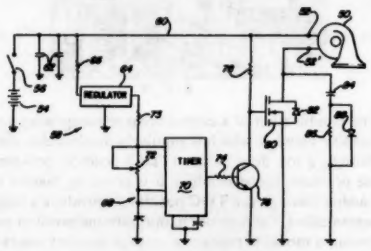
said body being comprises substantially of Mn_2O_3, NiO, Co_3O_4, Al_2O_3, CuO, and FeO_3.

5,160,913

ELECTRIC HORN WITH SOLID STATE DRIVER

Young S. Yoon, Brighton, Mo., assignor to Sparton Corporation, Jackson, Mich.

Continuation of Ser. No. 431,696, Nov. 3, 1989, Pat. No. 5,049,853, which is a continuation of Ser. No. 109,778, Oct. 19, 1987, abandoned. This application Sep. 16, 1991, Ser. No. 760,603
The portion of the term of this patent subsequent to Sep. 17, 2008, has been disclaimed.
Int. Cl.[5] G08B 3/10
U.S. Cl. 340—388 **5 Claims**



1. A vehicle horn for an automotive vehicle having a vehicle battery with a voltage rating of twelve volts or greater, said horn comprising:

a closed housing having a diaphragm mounted on the housing with its periphery clamped thereto and forming a substantially closed chamber,

a driving coil mounted within said chamber,

a ferromagnetic plunger coupled to the center of said diaphragm and extending into said coil for imparting motion to the diaphragm upon energization,

said diaphragm suspending said plunger for reciprocating motion relative to said coil and having a spring characteristic whereby the coupled diaphragm and plunger have a resonant frequency of mechanical vibration of about four hundred hertz,

a solid state driver circuit coupled between said battery and said coil for energizing said coil,

said driver circuit including a timer for generating a DC pulse train having a duty cycle of sixty percent or greater,

said timer including an adjustable resistor for adjusting the pulse repetition rate of said pulse train, said resistor being adjustable during manufacture of said horn and having an adjusted value which sets said pulse repetition rate substantially equal to said resonant frequency.

5,160,914

VEHICLE SECURITY SYSTEM WITH SPEED SENSOR AND DOOR INTERLOCK

Tsutomu Sato, Iwaki, Japan, assignor to Alpine Electronics, Inc., Iwaki, Japan

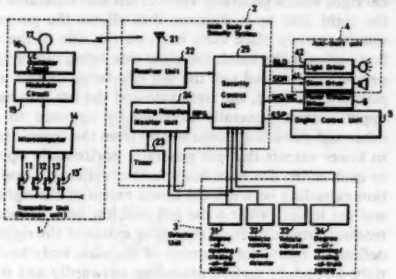
Filed Dec. 17, 1990, Ser. No. 628,515
Claims priority, application Japan, Dec. 18, 1989, 1-328983
Int. Cl.[5] B60R 25/10
U.S. Cl. 340—426 **6 Claims**

1. A vehicle security system comprising:

a portable transmitter for transmitting an arming signal for arming the system;

a speed sensor for detecting the speed of the vehicle;

means mounted on the vehicle for receiving the arming signal and arming the system in response thereto; and



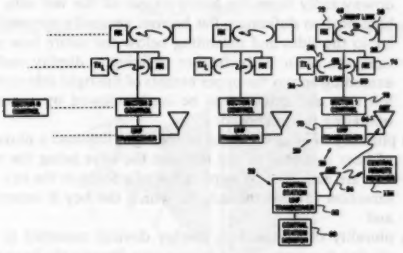
means for preventing arming unless the speed sensor detects a speed below a predetermined amount.

5,160,915

WIRELESS BISTATIC LINK INTRUSION DETECTION SYSTEM

Michael Z. Kiss, 418 S. Meadows Ave., Manhattan Beach, Calif. 90266

Filed Sep. 26, 1990, Ser. No. 588,948
Int. Cl.[5] G08B *13/18*
U.S. Cl. 340—552 **21 Claims**



1. An intrusion detection system comprising:

a plurality of microwave links, each defined by an operationally coupled transmitter and receiver, deployed to define a detection boundary;

said transmitter including an antenna for transmitting a microwave carrier signal, a status encoder for applying normal status information to said carrier signal representative of a normal operational status of that transmitter, and fault mirror means responsive to a fault condition at that transmitter for inhibiting the application of said normal status information to said carrier signal;

said receiver including an antenna oriented to receive said microwave carrier signal from the transmitter operationally coupled thereto, a processor for producing an alarm output responsive to an intrusion across the link associated with that receiver, and a status decoder for producing a status normal output responsive to said normal status information carried by said carrier signal; and

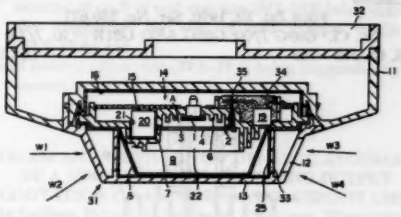
central station means located remote from said receiver and in wireless communication therewith for displaying the alarm outputs produced for each link.

5,160,916

IONIZATION TYPE SMOKE SENSOR

Kanji Ishii, and Atsushi Nagai, both of Yokohama, Japan, assignors to Hochiki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 20, 1990, Ser. No. 631,351
Claims priority, application Japan, Dec. 25, 1989, 1-335320
Int. Cl.[5] G08B *17/10*
U.S. Cl. 340—629 **4 Claims**



1. An ionization-type smoke sensor comprising: a printed circuit board with electrical parts mounted thereon; an inner electrode electrically connected with said printed circuit board, said inner electrode having a radiation source; an intermediate electrode disposed axially outward of said inner electrode and defining an inner ionization chamber in cooperation with said inner electrode, said intermediate electrode having an opening through which radiation from said radiation source passes; an outer electrode disposed axially outward of said intermediate electrode and defining an outer ionization chamber in cooperation with said intermediate electrode, smoke from outside being flowable into said outer ionization chamber; and an insulator supporting and insulating said inner electrode, said intermediate electrode and said outer electrode,

said ionization-type smoke sensor comprising further a fence portion formed on and projecting from a surface of said insulator facing said outer ionization chamber and surrounding the periphery of said opening of said intermediate electrode, said fence portion being made of an insulating material; said fence portion comprising a plurality of concentric fence members having a height increasing stepwise radially inward toward the center of said sensor.

5,160,917

ENERGY BEAM POSITION DETECTOR

Monroe S. Wechsler, and Scott T. Carey, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jun. 14, 1990, Ser. No. 538,135
Int. Cl.[5] G01P *13/00*
U.S. Cl. 340—686 **6 Claims**

1. A method of detecting unacceptable misalignment, straying, or spreading of an energy beam comprising:

positioning a shape memory alloy wire means along at least a portion of a boundary of acceptable beam trajectory, the shape memory alloy changing length in response to changes in temperature;

monitoring changes in length of the wire; and

producing a signal when the length of the wire changes a

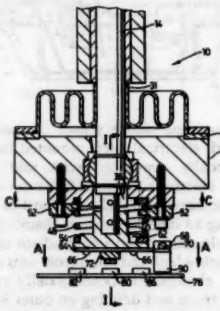
predetermined amount in response to proximity of the beam to the wire.

5,160,918

JOYSTICK CONTROLLER EMPLOYING HALL-EFFECT SENSORS

Fabio J. Saposnik, Willowdale, and Michael G. Barrette, Toronto, both of Canada, assignors to Orvitek, Inc., Ontario, Canada

Filed Jul. 10, 1990, Ser. No. 550,671
Int. Cl.[5] G09G *1/00*; G05G *9/00*; G01B *7/30, 7/14*
U.S. Cl. 340—709 **18 Claims**



1. A joystick device comprising:
a shaft;
a support surface spaced from one end of said shaft;
mounting means acting between said shaft and said support surface to allow pivotal displacement therebetween, said mounting means further allowing said shaft to be rotated about the longitudinal axis of said shaft;
first and second pairs of sensors on said support surface operating as differential pairs, said first pair of sensors being arranged along a first axis and said second pair of sensors being arranged along a second axis orthogonal to said first axis;
a single sensor on said support surface generally centrally located relative to said first and second pairs of sensors;
a pair of spaced, rotational sensors on said support surface;
at least one element on said shaft adjacent said one end thereof, said at least one element being movable over said support surface upon movement of said shaft, movement of at least one element being detected by said first and second pairs of sensors, said single sensor and said rotational sensors, said first and second pairs of sensors detecting the direct of displacement of said at least one element upon pivoting of said shaft from a datum and said single sensor detecting the magnitude of said displacement, said rotational sensors detecting the direction of rotation of said at least one element upon rotation of said shaft; and
control means receiving sensor output signals from said first and second pairs of sensors, said signal sensor and said rotational sensor corresponding to movement of said at least one element and outputting control signals representing the direction of movement of said at least one element to a dependent device to be controlled.

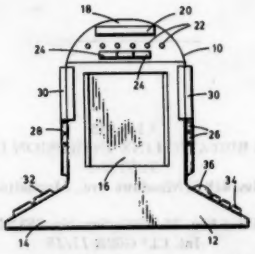
5,160,919

ERGONOMIC KEYBOARD

Jack M. Mohler, 420 N.E. 10th, and Jacque L. Havice, 800 North Maple, both of Abilene, Kans. 67410

Filed Sep. 10, 1990, Ser. No. 579,901
Int. Cl.[5] G09G *3/02*
U.S. Cl. 340—711 **4 Claims**

1. A keyboard apparatus for use by a person to manually input of information to a computer, typewriter or other keyboard operated device comprising in combination,
an upstanding unitary main body defining a generally vertical right side, a generally vertical left side separated from the right side by a distance that allows the person to simultaneously place each hand on the side of the main body nearest the hand, the right side being closer to the person's right hand and the left side being closest to the person's left hand, the right side and the left side having upper extents generally horizontally opposed to each other and extending downwardly from the upper extends to lower extents that are generally horizontally opposed to each other, the main body further defining a base portion extending between the lower extent of the right side and the lower extent o the left side, the base portion extending outwardly from the lower extent of the right side defining a right foot extension of the main body having a right secondary surface extending outwardly and downwardly from the lower extent of the right side and the base portion extending outwardly from the lower extent of the



left side defining a left foot extension of the main body having a left secondary surface extending outwardly and downwardly from the lower extent of the left side, the base portion defining a flat bottom generally perpendicular to the sides and extending below the entire base portion, the main body further defining a display surface extending across the upper extents of the right side and the left side and oriented to be easily viewed by a person operating the keyboard;
a plurality of keys mounted to the right side and a plurality of keys mounted to the left side the keys being the type that are activated by application of a force to the key in a direction toward the side to which the key is mounted; and
a plurality of information display devices mounted to the display face; whereby a person may operate the keyboard with each hand positioned midway between pronation and supination adjacent to a side of the keyboard and the person may view the information display devices while operating the keyboard.

5,160,920

FAIL SAFE DISPLAY FOR SHELF LABELS

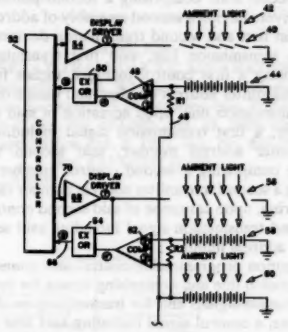
Richard H. Harris, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 7, 1990, Ser. No. 623,847
Int. Cl.[5] G09G *3/36*
U.S. Cl. 340—765 **15 Claims**

1. A device for displaying information comprising:
a liquid-crystal display (LCD) means, said display means carrying a plurality of display segments which are grouped to form desired shapes and/or alphanumeric characters;
a support means coupled to the LCD means, said support means providing photovoltaic conversion from light passing through said LCD means and having a plurality of photovoltaic segments thereon, with said segments being

arranged into shapes and/or alphanumeric characters which are similar to those on the LCD means; and

control means coupled to the liquid crystal display (LCD) means and the support means; said control means monitoring the support means to detect electrical signals generated as a result of light transmitted through the liquid crystal display means and using said electrical signals to generate error signals representative of malfunctioning display segments.



5,160,921

DISPLAY APPARATUS FOR ALPHANUMERIC DISPLAYS

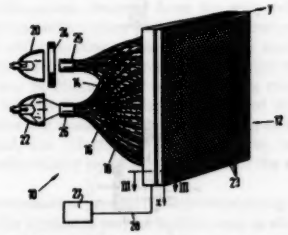
Erich Killinger, Gaggenau, Fed. Rep. of Germany, assignor to Dambach-Werke GmbH, Fed. Rep. of Germany

Filed Dec. 18, 1989, Ser. No. 452,225

Claims priority, application Fed. Rep. of Germany, May 19, 1989, 3916290

Int. Cl.[5] G09G *3/34*

U.S. Cl. 340—783 **15 Claims**



1. In a display apparatus for alphanumeric displays having a display panel (12), a plurality of display elements (23,), a plurality of controllable light sources (20, 22) which illuminate a plurality of bundles of optical fibers (25, 26), a plurality of switch elements (43, 43'; 43.1–43.4) triggerable from a control line, one of said switch elements (43, 43'; 43.1–43.4) introduced into each light path leading through an optical fiber (14, 16, 18) of said bundle of optical fibers (25, 26) to each said display element (23), and said switch element (43, 43'; 43.1–43.4) selectively controlling said light path,

the improvement comprising: each said display element (23) of said display panel (12) having one said light path;

said display elements (23) being disposed in at least two internested matrices (M1–M4);

each said bundle of optical fibers (25, 26) associated with one of said internested matrices (M1–M4), each said bundle of optical fibers (25, 26) illuminated by a separate one of said controllable light sources (20, 22);

each said switch element (43, 43'; 43.1–43.4) individually triggerable through said control line (1-k.l) by one of a plurality of control subcircuits (27.1–27.4) for each of said matrices (M1–M4) by a control unit (27), generating at least one of said alphanumeric displays and a multi-color alphanumeric display simultaneously, said multi-color alphanumeric display having filters (24, 31) disposed between said light source (20, 22) and said optical fibers (14, 16, 18);

one of said control subcircuits (27.1–27.4) being associated with each of said matrices (M1–M4), each said switch element of each of said matrices (M1–M4) being individually triggerable by one of said control subcircuits (27.1–27.4); and

said control subcircuits (27.1–27.4) being triggerable by said control unit (27).

5,160,922

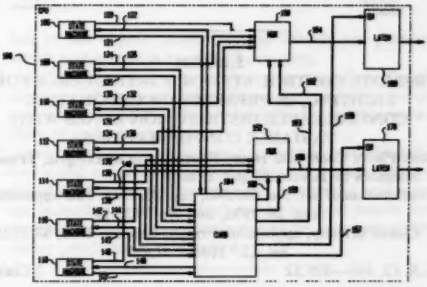
SYSTEM AND METHOD FOR DYNAMIC AVOIDANCE OF A SIMULTANEOUS SWITCHING OUTPUT LIMITATION OF AN INTEGRATED CIRCUIT CHIP

John DeRosa, Princeton; Lauren M. Hagstrom, Worcester; Lon S. Hilde, Lunenburg, and Oren Wiesler, Acton, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 29, 1990, Ser. No. 546,556

Int. Cl.[5] G06F *13/00*

U.S. Cl. 340—825.5 **42 Claims**



1. A system for limiting the number of simultaneously switching outputs of an integrated circuit chip at or below a predetermined limit for the chip during a short, predetermined time window, comprising means for arbitrating, according to the simultaneous switching output limit of the chip, the use of M chip resources of a predetermined type of which only N of such chip resources are used during said short, predetermined time window, with $N>0$, $M>0$, and $N \leq M$.

5,160,923

PRIORITY ENCODER FOR RESOLVING PRIORITY CONTENTION

Akihiko Sugawara, and Yoshihito Takahashi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Oct. 11, 1990, Ser. No. 596,106

Claims priority, application Japan, Oct. 11, 1989, 1-264776

Int. Cl.[5] G06F *13/18*

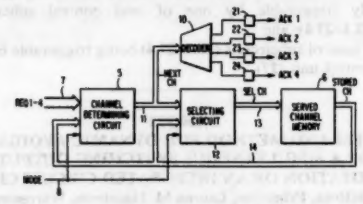
U.S. Cl. 340—825.51 **7 Claims**

1. A priority encoder for determining one of a plurality of channels to be served, comprising:

determining means for receiving a plurality of request signals generated by said plurality of channels, a mode signal indicating one of a fixed priority mode and a rotating priority mode, and a stored channel signal indicating a previously served channel, said determining means for generating a next channel signal indicating one of said plurality of channels according to a fixed priority order independently of said stored channel signal when said mode signal indicates said fixed priority mode, and ac-

cording to a rotating priority order in reference to said stored channel signal when said mode signal indicates said rotating priority mode;

selecting means for receiving said next channel signal, said stored channel signal, and said mode signal, said selecting means for generating as a selected channel signal said next channel signal when said mode signal indicates said rotating priority mode, and said stored channel signal when said mode signal indicates said fixed priority mode; and



memory means for storing said selected channel signal and for supplying said selected channel signal to said determining means and said selecting means as said stored channel signal whereby said priority encoder prevents bus latency of one of said plurality of channels when said mode signal indicates from said rotating priority mode to said fixed priority mode and then to said rotating priority mode.

5,160,924

REMOTE CONTROL SYSTEM, PARTICULARLY FOR LIGHTING, IN PREMISES INCORPORATING CONTROLLABLE DISTRIBUTION ZONES WITH VARIABLE CONFORMATIONS

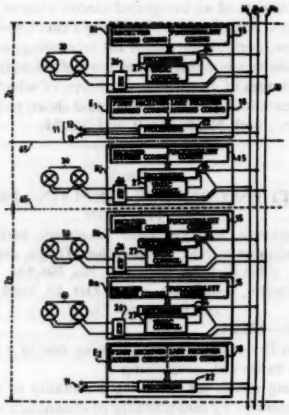
Jean-Pierre Conil, and Henri Pierrot, both of Longvic, France, assignors to Telemecanique, France

Continuation of Ser. No. 409,848, Sep. 20, 1989. This application Aug. 28, 1991, Ser. No. 752,913

Claims priority, application France, Sep. 20, 1988, 88 12239

Int. Cl.[5] H04M *11/04*

U.S. Cl. 340—825.52 **3 Claims**



1. A remote-control system, particularly for lighting, in premises incorporating at least first and second distribution zones with variable conformations, comprising :

i) a transmission line common to said zones ;

ii) a plurality of local receivers connected to said transmission line, each receiver being equipped with first means for coding a proper receiver address number and means for controlling user appliances upon detection of said proper address number in a control signal emitted on said transmission line,

said first zone comprising a first plurality of local receivers having a first assembly of address numbers,

said second zone comprising a second plurality of local receivers having a second assembly of address numbers,

iii) at least first and second transmission devices connected to the transmission line, said first transmission device comprising a first control member, means for coding a first transmitter address number, and means delivering on the transmission line, upon actuation of said first control member, a first transmission signal including said first transmitter address number, said second transmission device comprising a second control member, means for coding a second transmitter address number and means for delivering, upon actuation of said second control member, a second transmission signal including said second transmitter address number ;

iv) a common programmable central unit connected to the transmission line and comprising means for receiving said transmission signals and for transmitting on the transmission line, a control signal including said first assembly of address numbers upon reception of said first transmitter address number and a control signal including said second assembly of address numbers upon reception of said second transmitter address number.

5,160,925

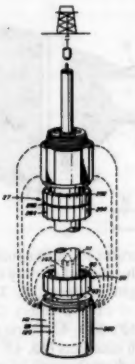
SHORT HOP COMMUNICATION LINK FOR DOWNHOLE MWD SYSTEM

Patrick E. Dailey, Lomita, Calif.; Charles D. Barron, Kingwood, Tex., and Louis H. Rorden, Los Altos, Calif., assignors to Smith International, Inc., Houston, Tex. and Develco, Inc., San Jose, Calif.

Filed Apr. 17, 1991, Ser. No. 686,772

Int. Cl.[5] G01V *1/00*

U.S. Cl. 340—853.3 **80 Claims**



1. A measurement while drilling system, comprising:

a drill string including a bottom-hole assembly, terminating in a drill bit;

a motor means in said bottom-hole assembly, positioned uphole from said drill bit, for producing relative motion at one end of the motor with respect to the other end of the motor;

means, as part of said bottom-hole assembly, for sensing parameters downhole, wherein said sensing means is positioned downhole from said motor means and includes a communication device, including a transmitter and a receiver;

a control module as part of said bottom-hole assembly, in-

cluding a transmission means, positioned uphole from said motor means;

wherein said control module transmits a command signal to said sensing means, and said sensing means transmits a data signal representative of a sensed parameter to said control module.

5,160,926

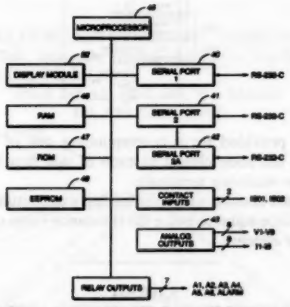
DISPLAY TRANSDUCER APPARATUS

Edmund O. Schweitzer, III, Whitman County, Wash., assignor to Schweitzer Engineering Laboratories, Inc., Pullman, Wash.

Continuation of Ser. No. 373,040, Jun. 28, 1989, abandoned. This application Apr. 4, 1991, Ser. No. 682,395

Int. Cl.[5] G01R *31/08*

U.S. Cl. 340—870.02 **16 Claims**



1. An apparatus for connection to a digital protective relay connected to a power system, comprising:

means for providing digital communication between the relay and the apparatus;

means for obtaining power system information in digitized format from the relay;

means for selectively displaying at least some of the power system information obtained from the relay wherein the power system information includes fault location information and said obtaining means provides for storing information for a plurality of discrete faults which fault information may be displayed by said displaying means;

means for selectively converting the digitized information into at least one analog signal and providing an output for said signal, the information represented by said signal being preferentially selectably by a user of the apparatus; and

serial communication means for communicating with the relay so the apparatus may be located near or at a distance from the relay.

5,160,927

SYSTEM AND METHOD FOR DETECTING THE PRESENCE OF OBJECTS IN THE PATH OF MOVABLE VEHICLE

James R. Cherry, Windham, N.H.; David P. Stevens, Billerica, and Abel Raynus, Brookline, both of Mass., assignors to Armatron International, Inc., Melrose, Mass.

Continuation of Ser. No. 514,389, Apr. 25, 1990, abandoned. This application Sep. 10, 1991, Ser. No. 758,244

Int. Cl.[5] G08G *1/16*

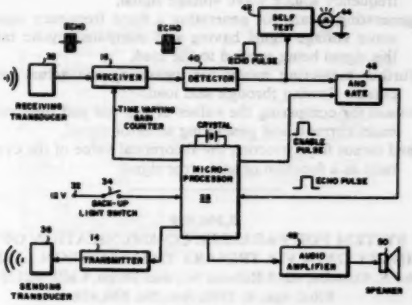
U.S. Cl. 340—904 **16 Claims**

1. A system for detecting the presence of objects in the proximity of a movable vehicle, said system comprising:

A. transmitter means for transmitting bursts of an object detection signal,

B. receiver means for receiving said object detection signal both as a direct signal from said transmitter means and as an indirect signal reflected from an object in the proximity of the movable vehicle,

C. said transmitter means and said receiver means being positioned on said movable vehicle so that points of signal reflection having different total trasit times of the signal from said transmitter means to the reflecting object and back to the receiver means lie on a family of elliptical paths having as their foci, said transmitter means and said receiver means, said family of elliptical paths including one elliptical path which is closest to said transmitter means and said receiver means and which is defined by the



loci of the objects closest to said vehicle end portion which said system is capable of detecting,

D. verification means responsive to the reception of said direct signal from said transmitter means at said receiver means for providing a first signal indicative of the operability of said system; and

E. warning means responsive to the reception of said indirect signal reflected from said object having a predetermined total transmit time from said transmitter means to the reflecting object and back to the receiver means for providing a second signal indicative of the detection of the object proximate to said vehicle.

5,160,928

SYSTEM FOR REGULATING THE MEAN CURRENT FLOWING THROUGH THE LOAD OF AN ELECTRIC REMOTE CONTROL DEVICE

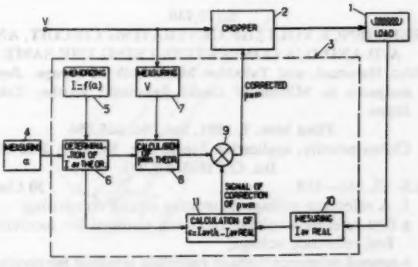
J. Pierre Rigat-Esselin, Tassin la Demi Lune; Patrick Gerbier, Montluel, and Marc Menvielle, Toulouse, all of France, assignors to Rexroth-Sigma, France

Filed Jun. 15, 1990, Ser. No. 539,569

Claims priority, application France, Jun. 16, 1989, 89 08041

Int. Cl.[5] G05F *1/44*

U.S. Cl. 341—20 **17 Claims**



1. System for regulating the mean current flowing through a load from an actuating member one parameter of which forms initial variable control information, a DC supply voltage

source being provided for supplying this load, said system comprising:

measuring means for continuously measuring the value of the initial variable control information,

determination means for determining a mean theoretical current value corresponding to each value of the variable control information measured by said measuring means,

means for measuring the actual DC voltage supplied by the DC supply voltage source,

computing means for computing, from the mean theoretical current value determined by said determining means and the measured value of the DC supply voltage, a theoretical value of the cyclic ratio of a predetermined fixed frequency square wave voltage signal,

generating means for generating a fixed frequency square wave voltage signal having said computed cyclic ratio, this signal being applied to the load,

further measuring means for measuring the actual mean current flowing through said load,

means for comparing the values of the real and theoretical mean currents and generating an error signal,

and means for correcting the theoretical value of the cyclic ratio as a function of said error signal.

5,160,929

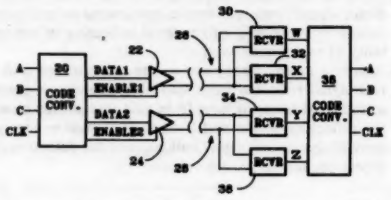
SYSTEM FOR PARALLEL COMMUNICATION OF BINARY DATA VIA TRINARY TRANSMISSION LINES

John F. Costello, 6243 Buisson St., San Diego, Calif. 92122

Filed Apr. 4, 1991, Ser. No. 680,431

Int. Cl.[5] H03M *5/16*

U.S. Cl. 341—57 **3 Claims**



1. A system for communicating a combination of 3N binary digits plus a data clock, "N" being a positive integer, comprising:

(a) means for converting the combination of the 3N binary digits and the data clock to a set of control signals corresponding to 2N trinary digits,

(b) means responsive to the set of control signals for communicating 2N trinary digit signals via transmission lines, one transmission line per trinary digit signal and

(c) means in signal communication with said transmission lines for converting said trinary digit signals to corresponding binary digits and a data clock.

5,160,930

REFERENCE VOLTAGE GENERATING CIRCUIT, AND A/D AND D/A CONVERTERS USING THE SAME

Shiro Hosotani, and Takahiro Miki, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 7, 1991, Ser. No. 665,856

Claims priority, application Japan, Apr. 18, 1990, 2-104306

Int. Cl.[5] H03M *1/00*

U.S. Cl. 341—154 **30 Claims**

1. A reference voltage generating circuit comprising:

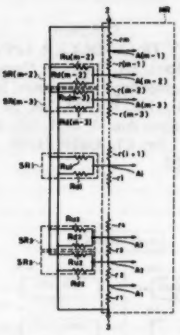
a first reference voltage receiving terminal for receiving a first reference voltage;

a second reference voltage receiving terminal for receiving a second reference voltage of a magnitude different from the magnitude of said first voltage;

a plurality of main resistor elements connected in series to each other at nodes between said first and second reference voltage receiving terminals,

each of said plurality of main resistor elements having the same resistance value; and

a plurality of resistor networks, each of said resistor networks provided for a corresponding one of said nodes except the node closest to each of said first and second voltage receiving terminals;



each of said resistor networks having a magnitude of output impedance equal to twice the resistance value of said main resistor element.

5,160,931

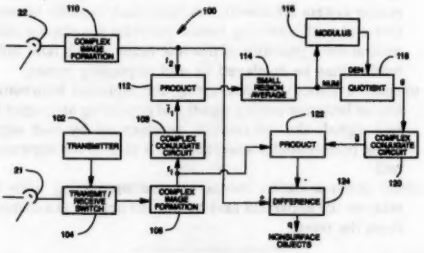
INTERFEROMETRIC SYNTHETIC APERTURE DETECTION OF SPARSE NON-SURFACE OBJECTS

William M. Brown, Ann Arbor, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Filed Sep. 19, 1991, Ser. No. 762,901

Int. Cl.[5] G01S *13/90, 15/89*

U.S. Cl. 342—25 **25 Claims**



1. A method of detecting non-surface objects employing a platform including first and second transducers, the first and second transducers each having a predetermined field of view and together forming an interferometer baseline, said method comprising the steps of:

moving the platform substantially perpendicular to a line though the first and second transducers,

repeatedly transmitting a radiant signal via at least one of the first and second transducers;

receiving reflections of each of the transmitted radiant signals via the predetermined field of view of at least one of the first and second transducers;

forming first synthetic aperture complex image data for a plurality of resolution cells in slant range and Doppler frequency from radiant reflections received by the first transducer employing plural transmitted radiant signals;

forming second synthetic aperture complex image data for a

plurality of resolution cells in slant range and Doppler frequency from radiant reflections received by the second transducer employing plural transmitted radiant signals;

determining the complex phase factor between said first and second synthetic aperture complex image data for each resolution cell in the absence of non-surface objects;

multiplying one of said first and second synthetic aperture complex image data of each resolution cell by the complex conjugate of the complex image data of the corresponding resolution cell of said complex phase factor, thereby forming a first product signal for each resolution cell; and

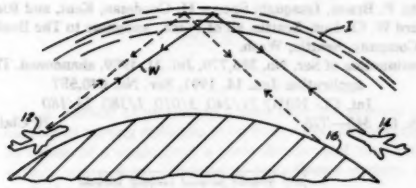
subtracting said first product signal of each resolution cell from the other of said first and second synthetic aperture complex image data of the corresponding resolution cell, thereby forming a difference signal for each resolution cell which is substantially zero except in the presence of a non-surface object.

5,160,932

OVER-THE-HORIZON SYNTHETIC APERTURE RADAR

James G. Bull, Issaquah, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jul. 13, 1990, Ser. No. 553,441
Int. Cl.[5] G01S *13/90*
U.S. Cl. 342—25 **8 Claims**



8. A method of locating a target object comprising the steps of:

receiving ionospherically propagated electromagnetic radiation at an antenna;

producing a receiver output when the ionospherically propagated electromagnetic radiation received by the antenna is in the 3-to-30 MHz frequency range;

synthesizing the receiver output to establish a synthetic aperture output representative of the receiver outputs produced over a synthetic antenna aperture; and

processing the synthetic aperture output to locate the target object.

5,160,933

RADAR ALTIMETER WITH SELF-CALIBRATION FEATURE

James R. Hager, Crystal, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 573,988, Aug. 28, 1990, abandoned. This application May 20, 1991, Ser. No. 702,403
Int. Cl.[5] G01S *7/40*
U.S. Cl. 342—174 **6 Claims**

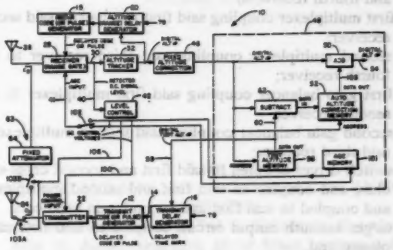
1. In an aircraft radar altimeter of the type including means for periodically transmitting a pulse of electromagnetic energy, means for receiving a return pulse from a target, said means for receiving including tracking means for continuously adjusting a range gate delay to orient a range gate in time coincidence with the leading edge of said return pulse, and interval measuring means for measuring a first interval between the transmitted pulse and said range gate, the improvement comprising:

(a) calibration circuit means coupled to receive a signal proportional to said measured first interval, said calibration circuit means including:

(i) first memory means for periodically storing said first interval corresponding to a measured altitude for the duration of a calibration sequence;

(ii) second memory means for storing correction factors for all altitudes at which the aircraft is expected to fly, wherein each said interval altitudes correspond to a unique said correction factor;

(iii) means for periodically applying a pseudo return pulse to said receiving means a predetermined delay time following a marker event, said delay time corresponding to the respective correction factor stored in said second memory means and proportional to the altitude



at which said aircraft is then flying, said tracking means orienting said range gate in time coincidence with the leading edge of said pseudo return pulse, said interval measuring means measuring a second interval between said marker event and said range gate;

(iv) means for subtracting a signal proportional to said second interval from a signal proportional to said first interval to develop an error signal; and

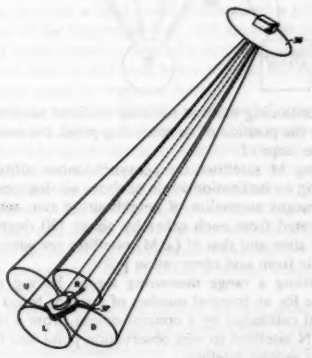
(v) means for adjusting said actual interval stored in said first memory means by said error signal following completion of said calibration phase.

5,160,934

CROSS-SWITCHED MICRAD SEEKER

Frederick C. Alpers, and Mervyn C. Hoover, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 27, 1984, Ser. No. 649,501
Int. Cl.[5] G01S *3/02, 5/04*
U.S. Cl. 342—351 **13 Claims**



1. A Cross-Switched MICRAD seeker, comprising:

a microwave antenna having four receiving channels configured as a right (R) channel, a left (L) channel, and up (U) channel, and a down (D) channel;

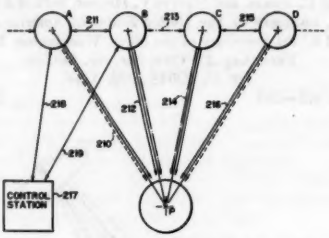
a first ferrite cross-switch coupled to said R channel and said L channel;
a second ferrite cross-switch coupled to said U channel and said D channel;
a first receiver coupled through said first ferrite cross-switch to said R channel and said L channel;
a second receiver coupled through said first ferrite cross-switch to said R channel and said L channel;
a third receiver coupled through said second ferrite cross-switch to said U channel and said D channel;
a fourth receiver coupled through said second ferrite cross-switch to said U channel and said D channel;
a local oscillator coupled to each of said first, second, third, and fourth receivers;
a first multiplexer coupling said first receiver to said second receiver;
a second multiplexer coupling said third receiver to said fourth receiver;
a first gain balancer coupling said first multiplexer to said second receiver;
a second gain balancer coupling said second multiplexer to said third receiver;
a switch driver coupled to said first and second cross-switches, and coupled to said first and second multiplexers, and coupled to said first and second gain balancers;
a target azimuth output circuit coupled to said first multiplexer; and
a target elevation output circuit coupled to said second multiplexer.

5,160,935

POSITIONING METHOD UTILIZING ARTIFICIAL SATELLITES IN GEOSYNCHRONOUS ALTITUDE ORBITS

Kenichi Inamiya, Kanagawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Nov. 27, 1991, Ser. No. 799,443
Claims priority, application Japan, Nov. 28, 1990, 2-328438; Apr. 22, 1991, 3-90628
Int. Cl.[5] G01S *5/12;* **H04B** *7/185*
U.S. Cl. 342—357 **8 Claims**



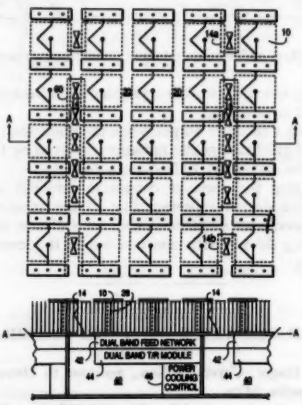
1. A positioning method utilizing artificial satellites for determining the position of an observing point, the method comprising the steps of:
disposing M satellites on geosynchronous altitude orbits having an inclination angle of about six degrees such that the means anomalies of neighbouring two satellites are separated from each other by about 120 degrees at the same time and that N (<M) satellites are simultaneously visible from said observation point;
transmitting a range measuring signal, having a constant phase for an integral number of seconds based on a time signal calibrated by a control station, from a first one of said N satellites to said observation point and to a subsequent second satellite;
reflecting the received range measuring signal from said second satellite to said first satellite;
transmitting from said first satellite to said control station, the range measuring signal originally generated by said first satellite and the range measuring signal reflected by said second satellite;
comparing the phase of the two range measuring signals in said control station to detect a phase difference therebetween;
transmitting the phase difference from said control station to said second satellite;
transmitting a phase comparison indicator and a range measuring signal, from said second satellite to said observation point, unique to said second satellite and also transmitting the range measuring signal unique to said second satellite from said second satellite to a neighbouring third satellite, thereby transmitting respective range measuring signals and phase comparison indicators from said N satellites to said observation point; and
in said observation point, calculating, for each pair of neighbouring two satellites selected from said N satellites, a difference between the ranges between said neighbouring two satellites and said observation point on the basis of the times of arrival of the range measuring signals, the times of transmision thereof obtained from the range measuring signals and predicted positions of said N satellites, thereby determining the position of said observation point.

5,160,936

MULTIBAND SHARED APERTURE ARRAY ANTENNA SYSTEM

John P. Braun, Issaquah; Sperry H. Goodman, Kent, and Richard W. Carlson, Seattle, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 386,770, Jul. 31, 1989, abandoned. This application Jan. 14, 1991, Ser. No. 640,557
Int. Cl.[5] H01Q *21/240, 5/010, 1/380, 13/180*
U.S. Cl. 343—725 **20 Claims**



1. A multiband shared aperture array antenna system requiring high-gain antenna patterns, comprising:
a conductive ground plane;
a plurality of mutually spaced printed circuit elements forming a first array antenna operative at a first nominal frequency band;
means for supporting said printed circuit elements separated from and parallel to said ground plane;
said ground plane having a plurality of slots mutually spaced and positioned between predetermined ones of said printed circuit elements, said slots forming a second array antenna operative at a second nominal frequency band lower than the first nominal frequency band, said slots being covered with a frequency selective surface to prevent coupling of the first nominal frequency into the slots; and

means for individually exciting each of said printed circuit elements to radiate energy at the first nominal frequency band and each of said slots to radiate energy at the second nominal frequency band lower than the first nominal frequency band, each frequency capable of being radiated independent of the other frequency.

5,160,937

METHOD OF PRODUCING A DUAL REFLECTOR ANTENNA SYSTEM

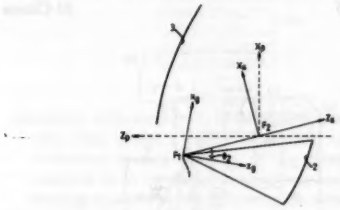
Robert H. Fairlie, and Simon J. Stirland, both of Stevenage, United Kingdom, assignors to British Aerospace Public Limited Company, London, England

Continuation of Ser. No. 363,262, Jun. 8, 1989, abandoned. This application Jul. 12, 1991, Ser. No. 729,839

Claims priority, application United Kingdom, Jun. 9, 1988, 8813655

Int. Cl.[5] H01Q *13/00*

U.S. Cl. 343—781 P **9 Claims**



1. A method of producing a dual reflector antenna system capable of passing radiation to or from a shaped coverage area by means of a single feed, a three dimensional main reflector surface and a three dimensional subreflector surface, which method comprises the steps of:

defining at least one desired parameter from the group consisting of power levels of radiation or desired directivity characteristics of radiation to be incident on selected regions of said shaped coverage area, having a residual of the form

$$Fj = \max\left(0.0,\ Wj\left[1.0 \frac{-Dj}{PjDj^2 Do}\right]\right)$$

where:

Pj=weighting factor for the j^{th} point to produce stepped regions; Dj=directivity at j^{th} point; Do=a constant reference directivity; Wj=weighting factor to emphasize or de-emphasize the residual at the j^{th} point,

tracing a regular grid of rays only in a forward direction through the antenna system from the feed to the sub-reflector surface and from the sub-reflector surface to the main reflector surface, where the rays become a set of irregularly distributed points of incident values of said radiation, in a ray generation coordinate system where

$$\theta = (\theta x^2 + \theta y^2)^{\frac{1}{2}},$$

where (θ_x, θ_y) are the coordinates of a point on a square grid in the (θ_x, θ_y) plane,

iteratively determining said residual by calculating from said θ_x, θ_y grid, obtaining a test value of the form

$$/TEST = /max[1.0\text{-}\delta] = 0,$$

where $\delta = A/\!/A_o/^*FRAC$; $\delta < 1.0$ for some j, and $\delta > 1.0$ for all j indicative of deviation of said parameter from a desired characteristic,

three dimensionally modifying both said reflector surfaces simultaneously by obtaining quantities A_x, A_y and A_z for points on the square grid to obtain an improved test value, and

repeating said tracing step, said iteratively determining step, said modifying step and said obtaining a test value step until providing an antenna which forms a beam in operation which is matched to said shaped coverage area.

5,160,938

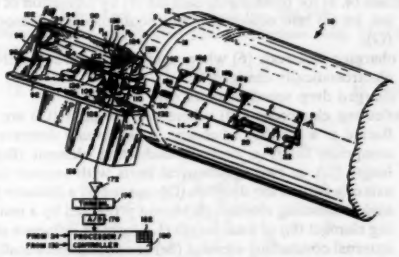
METHOD AND MEANS FOR CALIBRATING AN INK JET PRINTER

Foster M. Fargo, Lincoln; Ted S. Geiselman, Groveland, and Alan H. Jones, Arlington, all of Mass., assignors to IRIS Graphics, Inc., Bedford, Mass.

Filed Aug. 6, 1990, Ser. No. 562,701

Int. Cl.[5] G01D *18/00*

U.S. Cl. 346—1.1 **23 Claims**



1. Calibration apparatus for an ink jet printer including a recording medium support having an axis and a support surface, and a print head which emits an ink jet and is movable parallel to said axis in an axial direction along said support surface between a head home position and a position beyond one end of the support surface, said apparatus comprising

head home detection means for detecting the presence of the print head at said head home position and emitting a head home signal in response thereto;

an ink jet sensor positioned at a selected distance in said axial direction beyond said one end of the support surface and movable perpendicular to said axis between a sensor home position at a selected location relative to said recording medium support and a position at which the sensor can intersect said ink jet, said sensor emitting a sensor signal when said sensor does intersect said ink jet;

means for detecting the presence of said sensor at said sensor home position and emitting a sensor home signal in response thereto;

first moving means and second moving means for moving the print head and sensor, respectively, from their respective home positions over first and second distances so that the sensor intersects said ink jet, and

a controller responsive to said head home signal and said sensor home signal and said sensor signal for determining and storing said first and second distances.

5,160,939

DEVICE FOR CONTROLLING AND REGULATING AN INK AND PROCESSING THEREOF IN A CONTINUOUS INK JET PRINTER

Paul Bajeux, Bourg De Peage, and Alain Dunand, Valence, both of France, assignors to Imaje S.A., Bourg-Les-Valence, France

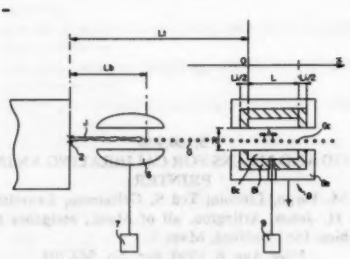
PCT No. PCT/FR89/00484, § 371 Date May 17, 1990, § 102(e) Date May 17, 1990, PCT Pub. No. WO90/03271, PCT Pub. Date Apr. 5, 1990

PCT Filed Sep. 11, 1989, Ser. No. 460,337

Claims priority, application France, Sep. 29, 1988, 88 12935

Int. Cl.[5] E01D *15/18*

U.S. Cl. 346—75 **15 Claims**



1. Device for controlling and regulating ink in a continuous ink jet printer in which a continuous ink jet (J) leaves a nozzle (2), comprising:

means (4, 5) for breaking-up said ink (J) by formation of said ink jet (J) into equidistant and equidimensional droplets (G);

a charging electrode (6) where said droplets are selectively electrostatically charged;

a charged drop speed detector (8);

deflecting electrodes (10) where said droplets (G) are deflected as a function of charge, wherein said detector (8) comprises firstly a central conducting element (8c) of length (L), in two symmetrical parts with respect to an axis of a path of the droplets (G), spaced by a distance (R), said conducting element (8c) being protected by a insulating element (8_i) of total length (L_i) from an influence of an external conducting element (8e) connected electrically to ground, satisfying the relations:

$$R < L_e \text{ and } L_e = L + L_i/2$$

L_e being an effective length of said detector (8) and wherein said device further comprises an electric drop speed detection circuit (9) including

means for measuring a charge per unit length (σ_x) according to the equation:

$$\sigma_x = \frac{-Qg}{R}\left[\cosh\left[\frac{2\pi(x - x_i)}{R}\right]\right]^{-1}$$

where Qg is a charge on the droplets and x_i is a position of the droplets in the detector (8);

means for measuring an evolution of a total charge Q carried by the conductive element (8c) of effective length (Le) according to the equation:

$$Q = \int_0^L \sigma(x)dx;$$

means for measuring the evolution of said total charge Q with respect to a time f(t) according to the following:

$$Q = f(t)$$

means for measuring a first derivative I(t) and a second derivative J(t) with respect to the time of total charge Q means for calculating the drop speed V with the two inflexion points of the function Q=f(t) corresponding to time T_1 and T_2, by the relation:

$$V = Le/(T_2 - T_1).$$

5,160,940

INK-JET PRINTING DEVICE FOR STRAWS TO CONTAIN BIOLOGICAL FLUIDS

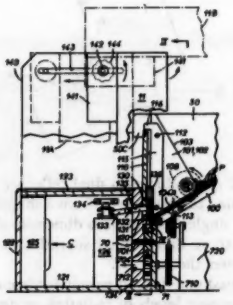
Robert Cassou, "Les Camus" , Sainte Montaine 18700 Aubigny-sur-Nere; Maurice Cassou, 10 Rue Clémenceau, and Bertrand Cassou, 10 Rue Georges Clémenceau, both of 61300 L'Aigle, all of France

Filed Dec. 10, 1990, Ser. No. 625,099

Claims priority, application France, Dec. 11, 1989, 89 16341

Int. Cl.[5] G01D *15/16*; B41F *17/00*; B65G *15/44*; B65H *5/00*

U.S. Cl. 346—75 **32 Claims**



1. A printing machine for elongate cylindrical articles, including a printing station having a printing head, and handling apparatus for feeding the cylindrical articles to the printing head comprising:

an admission passage for receiving, guiding and feeding the cylindrical articles;

a wall, a suction port disposed in the wall at a downstream end of the admission passage and connected to a source of negative pressure such that a leading cylindrical article at the downstream end of said passage is adapted to be drawn to and held at the suction port;

conveying means disposed in working relationship with said suction port for conveying the cylindrical articles one by one past the printing head; and

a transfer plunger mounted for reciprocating along said wall between said suction port and the conveying means to transfer the leading cylindrical article from the suction port to the conveying means by displacement of the transfer plunger toward the conveying means;

whereby said conveying means transfers said cylindrical articles to said printing head.

5,160,941

METHOD FOR DRIVING THERMAL PRINT HEAD TO MAINTAIN MORE CONSTANT PRINT DENSITY

Yoshihisa Fujiwara, Kadoma, and Hirokazu Genno, Hirakata, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Apr. 23, 1991, Ser. No. 690,095

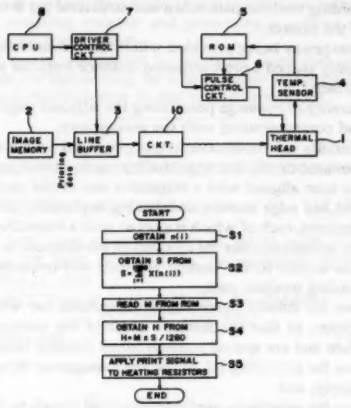
Claims priority, application Japan, Apr. 26, 1990, 2-111938

Int. Cl.[5] B41J *2/32*

U.S. Cl. 346—76 PH **3 Claims**

3. A method of driving a thermal head having a plurality of

heating resistors enabling recording of multiple gradations of printed density by the plurality of heating resistors, comprising the steps of:



obtaining difference (n(i)) in printed density between specific ones of the plurality of heating resistors and the remaining heating resistors of the plurality of heating resistors so as to obtain an imaginary number (S) of the heating resistors by the following equation:

$$S = \sum_{i=1}^{N} X(n(i))$$

where N denotes the number of the plurality of the heating resistors and X(n(i)) denotes a weight factor;

reading a maximum amount (M) of printed density decrease from a read-only memory so as to obtain an amount (H) of printed density correction by the following equation:

$H = M \times S/N$; and

forming a print signal corrected by the amount (H) of printed density correction so as to apply the print signal to said specific ones of the heating resistors.

5,160,942

SERIAL TYPE THERMAL PRINTER

Yasukuni Omata, Chigasaki, and Yoshinori Osamura, Yamato, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 23, 1987, Ser. No. 76,739

Claims priority, application Japan, Jul. 23, 1986, 61-173274; Jul. 23, 1986, 61-173275; Jul. 31, 1986, 61-181685; Jul. 31, 1986, 61-181686; Aug. 19, 1986, 61-193768; Aug. 19, 1986, 61-193769

Int. Cl.[5] G01D *15/10*

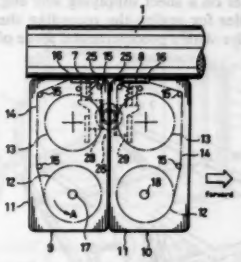
U.S. Cl. 346—76 PH **18 Claims**

1. A carriage shift type thermal printer, comprising:

a rotatable platen roller for guiding recording paper;

a carriage opposed to and reciprocable axially of said platen roller, said carriage including two ink films and ink film cassettes arranged axially of said platen roller, each of the cassettes being provided with a film supply reel and a film takeup reel arranged on a same plane in a direction perpendicular to the direction of carriage movement, head projecting means for pressing upon said platen roller two thermal heads associated with said cassettes, and ink film drive means for transporting the ink films in a direction parallel to the direction of carriage movement at a position opposed to said platen roller and for taking up ink films; and

control means for controlling said head projecting means and said film drive means;



wherein said two ink film cassettes are arranged on said carriage with respective ink film takeup directions opposite to each other.

5,160,943

PRINTING SYSTEMS

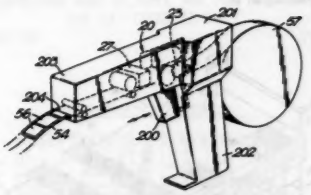
Robert M. Pettigrew, Foxton; Alan J. Harry, Royston; Paul R. Nailor, London, all of United Kingdom; Fred Adelmann, Eberbach am Neckar, Fed. Rep. of Germany; Peter Franzen, Hirschhorn am Neckar, Fed. Rep. of Germany, and Juergen Schoon, Eberbach am Neckar, Fed. Rep. of Germany, assignors to Esselte Meto International Produktions GmbH, Hirschhorn am Neckar, Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 286,746

Claims priority, application United Kingdom, Aug. 12, 1988, 8819180

Int. Cl.[5] B61J *2/325*

U.S. Cl. 346—76 PH **10 Claims**



1. A printer which comprises a housing; a printing unit; means for feeding a substrate to said printing unit; and means for supplying electrical power to operate the printer, characterized in that said feeding means comprises a piezoelectric motor.

5,160,944

THERMAL PRINTER WITH ANTI-SLIP SHEET CONVEYING MECHANISM

Hiroshi Fukumoto; Koji Namura, both of Hyogo; Hisashi Nakamura, Hiroshima; Keiichi Fukazawa, Hiroshima, and Kenichi Naruki, Hiroshima, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Apr. 11, 1991, Ser. No. 683,819

Claims priority, application Japan, Apr. 27, 1990, 2-114300

Int. Cl.[5] B41J *2/325, 11/00*

U.S. Cl. 346—76 PH **2 Claims**

1. A sheet conveying apparatus comprising:

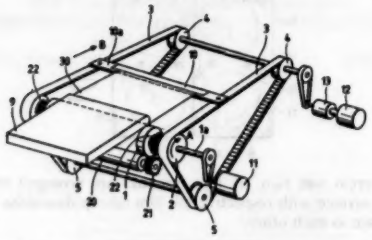
a platen roller having a cylindrical wall on which a recording sheet is wound, said platen roller conveying the recording sheet in a predetermined direction during printing;

a thermal head urged against said platen roller to heat heat-

ing points selected for transferring ink from an ink sheet onto the recording sheet;

sheet pulling means for pulling the recording sheet in said predetermined direction with a tensile force T that can vary between a maximum T_{max} and a minimum T_{min};

a pinch roller on a sheet supplying side engaged with said platen roller for urging the recording sheet against said platen roller with a predetermined force of depression P_B



so that the recording sheet is wound on said platen roller; and

roller rotating means for rotating said pinch roller with a peripheral speed lower than that of said platen roller,

wherein the predetermined force of depression P_B is in a range in which it prevents the recording sheet from slipping with respect to the platen roller when the tensile force has any value between T_{max} and T_{min}.

5,160,945

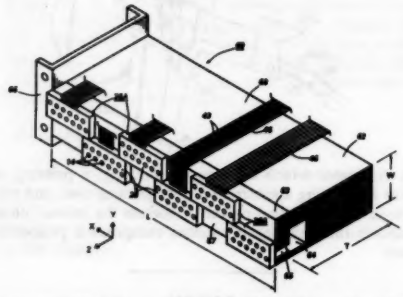
PAGEWIDTH THERMAL INK JET PRINTHEAD

Donald J. Drake, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 10, 1991, Ser. No. 698,206

Int. Cl.[5] B41J *2/05, 2/155*

U.S. Cl. 346—140 R **8 Claims**



1. A pagewidth, thermal ink jet printhead for use in an ink jet printer and of type assembled from a plurality of fully functional printhead subunits, each subunit having an array of droplet emitting nozzles, so that when the printhead is fixedly mounted in the printer, the nozzles confront a path through which a recording medium is moved to define a printing zone having the length of at least the width of a page, the printhead comprising:

a structural bar having an edge surface between end surfaces for mounting of roofshooter type printhead subunits thereon, the edge surface having a length at least equal to that of the printing zone, a predetermined width as measured in the direction perpendicular to the bar length and parallel to said bar edge surface, and a predetermined thickness as measured in a direction perpendicular to the bar edge surface, so that the edge surface of the bar has a surface area defined by the bar length and predetermined width, the predetermined width being a distance equal to a dimension of between one and two roofshooter type printhead subunits mounted on said bar edge surface, the predetermined bar thickness having a larger dimension than the bar width, the edge surface confronting the recording medium path when said structural bar is mounted in the printer;

a passageway being provided within the bar and being adjacently spaced a predetermined distance from the bar edge surface;

a plurality of openings penetrating the adjacent edge surface and communicating with the passageway;

a plurality of roofshooter type printhead subunits being mounted on the bar edge surface, each subunit having an ink inlet aligned with a respective one of the openings in said bar edge surface and having a plurality of heating elements, each of which is aligned with a respective one of the subunit nozzles for ejection of ink droplets in a direction normal to the heating elements and towards the recording medium path;

means for fixedly mounting the structural bar within the printer, so that the subunits confront the recording medium and are spaced predetermined distance therefrom;

means for providing ink to the bar passageway from an ink supply; and

means for selectively applying electrical signals to the heating elements of the subunits, the signals representing digitized data for the drop-on-demand ejection of ink droplets by the temporary vaporization of ink as a result of the application of the electrical signals, whereby the structural bar thickness is sufficient to provide enough mass for the bar to prevent its warping as a result of the operating temperature of the pagewidth printhead.

5,160,946

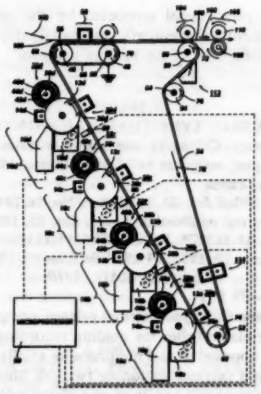
IMAGE REGISTRATION SYSTEM

Shyshung S. Hwang, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 19, 1991, Ser. No. 732,536

Int. Cl.[5] G03G *15/01, 15/04*

U.S. Cl. 346—157 **30 Claims**



1. An apparatus for providing image registration, comprising:

a receiving member;

a first photoreceptor;

first means for forming a first visible image and image registration indicia on said first photoreceptor;

first means for transferring the first visible image and the

visible image registration indicia from said first photoreceptor to the receiving member;

a second photoreceptor;

second means for forming a second visible image on said second photoreceptor;

means for sensing the visible image registration indicia on said receiving member and generating a control signal indicative thereof; and

second means, responsive to the signal from said sensing means, for transferring the second visible image from said second photoreceptor to said receiving member.

5,160,947

EYEGLASS FRAME WITH FLANGED BRIDGE OF NT ALLOY

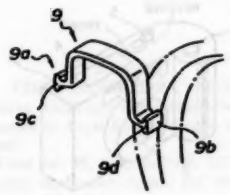
Isao Hyoi, Fukui, Japan, assignor to Murai Co., Ltd., Fukui, Japan

PCT No. PCT/JP88/01173, § 371 Date Jul. 17, 1990, § 102(e) Date Jul. 17, 1990, PCT Pub. No. WO90/05937, PCT Pub. Date May 31, 1990

PCT Filed Nov. 18, 1988, Ser. No. 536,569

Int. Cl.[5] G02C *5/14, 5/02*

U.S. Cl. 351—124 **1 Claim**



1. An eyeglass frame, comprising:

right and left frame portions for supporting right and left lenses therein;

right and left temples pivotally attached to said right and left frame portions, respectively; and

a bridge member connecting said right and left frame portions, said bridge member including two ends with each end provided with a flanged portion thereupon, said bridge member being formed of an NT alloy, said right and left frame portions are formed of a molded plastic material, and are molded to surround the flanged portions of the bridge, wherein the flanged portions are anchored in the right and left frame portions.

5,160,948

FILM-TO-TAPE TRANSFER APPARATUS

Jong-Chan Bae, Youngdeungpo-ku, Rep. of Korea, assignor to Dongyang Jonghap Corporation, Rep. of Korea

Filed Oct. 31, 1990, Ser. No. 606,317

Claims priority, application Rep. of Korea, Mar. 7, 1990, 2645/1990

Int. Cl.[5] G03B *31/00*

U.S. Cl. 352—1 **3 Claims**

1. A film-to-tape transfer apparatus comprising:

a case body having a bottom plate therein;

a rotary shaft rotatably installed on said bottom plate and having a manipulating knob mounted on a top portion thereof;

a supporting member secured to said rotary shaft;

a reflecting mirror attached to said supporting member;

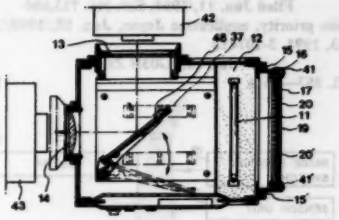
a glass screen unit provided on a first side of said case body;

a macro-lens provided on a second side of said case body;

a fluorescent lamp installed at a portion inside of a third side of said case body and electrically connected to a switch;

a transparent glass and pushing plate provided on said third side of said case body, said transparent glass and said pushing plate being slightly spaced with each other for receiving a photograph, said pushing plate having a plurality of resilient tongues thereof; and

a sound mixing unit provided on a fourth side of said case



body, said sound mixing unit including a plurality of controllers disposed on the upper portion of said fourth side, and a power switch and a plurality of jacks disposed on the lower portion of said fourth side.

5,160,949

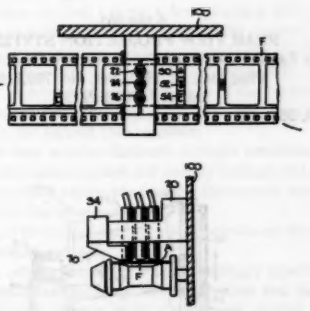
DIGITAL CUE SYSTEM FOR A MOTION PICTURE PROJECTION SYSTEM

Andrew J. Marglin, 39 Lloyd La., Lloyd Neck, N.Y. 11743

Continuation-in-part of Ser. No. 462,610, Jan. 9, 1990. This application May 24, 1991, Ser. No. 705,506

Int. Cl.[5] G03B *21/50*

U.S. Cl. 352—92 **17 Claims**



1. A system for activating one or more control functions during the presentation of a motion picture film comprising:

a) indicia provided along said motion picture film, each of said indicia defining a digital code pattern in accordance with the positioning of said indicia relative to said motion picture film;

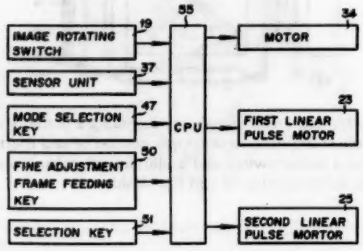
b) one or more non-contacting proximity detectors capable of generating signals representative of said digital code patterns when said indicia pass proximate thereto; and

c) circuit means for processing said signals to determine the digital code corresponding to each of said digital code patterns and activating a control function associated therewith.

5,160,950
IMAGE PROJECTING APPARATUS FURNISHED WITH IMAGE ROTATING MECHANISM

Koji Niizawa, Odawara, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 11, 1991, Ser. No. 713,680
Claims priority, application Japan, Jun. 13, 1990, 2-154656; May 13, 1991, 3-107413
Int. Cl.[5] G03B *23/08*
U.S. Cl. 353—26 A **17 Claims**



6. An image projecting apparatus for causing an image recorded on a microfilm to be magnified with a lens and, projected on a screen, comprising:

film retaining means for retaining said microfilm;

image rotating means for rotating a projected image;

first indicating means operated manually for indicating the direction of movement of said image projected on said screen;

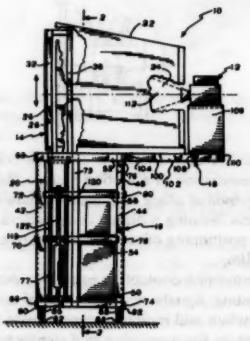
second indicating means for indicating the direction of movement of said film retaining means corresponding to the direction indicated by said first indicating means, wherein the correspondence of the direction indicated by said first indicating means to that indicated by said second indicating means is changed in accordance with the amount of rotation of said image rotating means, and

driving means for driving said retaining means in the direction indicated by said second indicating means.

5,160,951
REAR VIEW PROJECTION SYSTEM

Stephen Lander, 192 Wood St., Rutherford, N.J. 07070

Filed Oct. 21, 1991, Ser. No. 780,138
Int. Cl.[5] G03B *21/58*
U.S. Cl. 353—79 **6 Claims**



1. A rear view projection apparatus comprising:

a projector of a light beam to form images;

a screen made of a transparent material;

a base supporting the projector and having a recess for the screen;

a projector support which is mounted on the base;

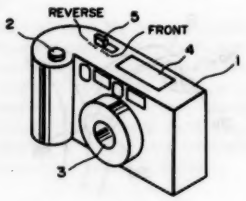
a retractable screen support received in the recess; said screen having a first face for reviewing the images and having a second face for receiving the images; and

said screen support having a top platform supporting the screen and having an extender scissor unit for extending and retracting the top platform and having a bottom platform supporting the extender scissor unit end being supported by the base.

5,160,952
PRINT CONTROL APPARATUS

Tomonori Iwashita, Yokohama; Akira Egawa, Machida, and Yoshiaki Sugiyama, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 346,914, May 4, 1989, abandoned. This application Apr. 17, 1991, Ser. No. 686,836
Claims priority, application Japan, May 9, 1988, 63-113277
Int. Cl.[5] G03B *29/00, 17/24*
U.S. Cl. 354—76 **78 Claims**



1. A camera system, comprising:

(a) a camera having an indication means for indicating information that data should be recorded on a printed photograph, said indication means selectively indicating whether data recording should be performed on a front surface or a reverse surface of the printed photograph; and

(b) a printing device comprising:

(i) an input means for inputting indicating information of said indicating means; and

(ii) a printing means for selectively printing the data onto the front surface or the reverse surface of the printed photograph in accordance with the indicating information of said input means.

5,160,953
CAMERA SYSTEM

Tomonori Iwashita, Kanagawa, and Sinichi Tsujimoto, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 646,458, Jan. 25, 1991, abandoned, which is a continuation of Ser. No. 400,104, Aug. 29, 1989, abandoned. This application Aug. 9, 1991, Ser. No. 743,034
Claims priority, application Japan, Sep. 1, 1988, 63-220046; Sep. 1, 1988, 63-220047; Sep. 1, 1988, 63-220048; Sep. 1, 1988, 63-220049; Sep. 1, 1988, 63-220050
Int. Cl.[5] G03B *1/12*
U.S. Cl. 354—173.1 **18 Claims**

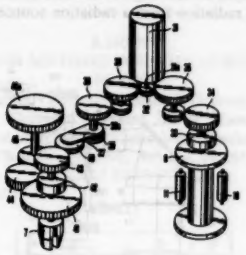
1. A camera comprising:

(a) operation means for operating a film feeding portion of a film cartridge in a winding direction for feeding out a film from said film cartridge and in a direction for rewinding the film into said film cartridge;

(b) drive force generating a means for generating drive force;

(c) first drive force transmitting means for transmitting the drive force of said drive force generating means to said

operation means to drive said operation means in the winding direction; and



(d) second drive force transmitting means for transmitting the drive force of said drive force generating means to said operation means to drive said operation means in the rewinding direction.

5,160,954

VIEWFINDER FOR CAMERA

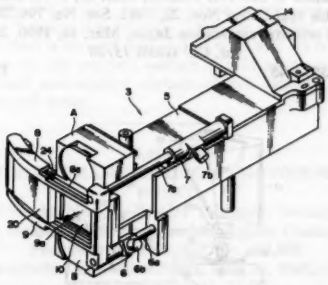
Nobuharu Suzuki, Aichi, and Tahei Morisawa, Tokyo, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 25, 1990, Ser. No. 557,062

Claims priority, application Japan, Jul. 26, 1989, 1-193304; Feb. 22, 1990, 2-41460

Int. Cl.[5] G03B *13/12, 13/14*

U.S. Cl. 354—221 **15 Claims**



1. A viewfinder mounted on a camera separate from a photographing lens comprising:

a lens system having an optical axis;

a prism for correcting parallax between said photographing lens and said lens system by being disposed in said lens system optical axis;

a driving mechanism for driving said prism slidably in a direction normal to said lens system axis, for inserting said prism into said axis of said lens system upon close-up photographing, and for extracting said prism from said axis of said lens system upon normal photographing;

means extending transversely to said optical axis, for guiding said prism for slidable movement by said driving mechanism; and

a close-up photographing lever mounted for movement in a direction substantially transverse to said lens system optical axis.

5,160,955

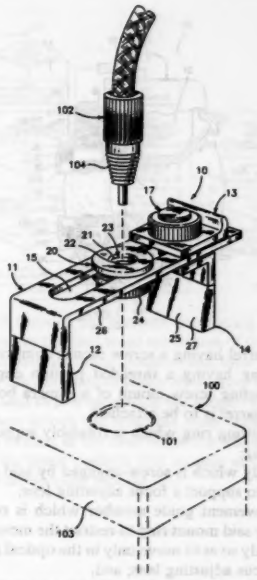
SHUTTER ACTUATING APPARATUS

Bradley J. Nihls, and Kathryn M. Nihls, both of 5393 Royal Hills Dr., St. Louis, Mo. 63129

Filed Feb. 4, 1991, Ser. No. 649,991

Int. Cl.[5] G03B *17/38*

U.S. Cl. 354—269 **5 Claims**



5. A shutter actuating apparatus used in combination with a camera, a camera shutter release mechanism and a cable shutter release comprising:

a. a first base member having a first gripping side member thereon to releasingly grip a body of the camera;

b. a second base member slidably engaged with the first base member and having a second gripping side member thereon to releasingly grip the body of the camera;

c. a longitudinal locating slot in the first base member;

d. a port in the second base member;

e. a second base member fastener, slidingly positioned in the longitudinal locating slot and passing through the port, to releasingly and adjustably connect the second base member to the first base member;

f. a rotation restriction tab on a bolt portion of the second base member fastener;

g. a cable release receiving adapter slidingly positioned in the longitudinal locating slot to position and align the cable shutter release with the camera shutter release mechanism;

h. a female thread, in a circumference of an inner passageway through the adapter, to releasingly receive a male thread of the cable shutter release;

i. an adapter fastener, threadingly placed on the adapter, to releasingly secure the adapter in a selected position along the longitudinal locating slot of the first base member; and

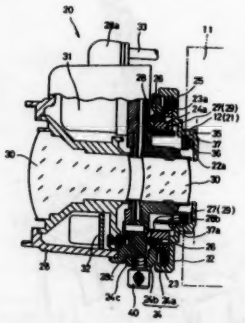
j. a coating of pliable plastic-like material on a lower surface of the first base member and on a lower surface of the second base member to protect the body of the camera and to enhance the grip of the side member of the first base member and the grip of the side member of the second base member on the body of the camera.

5,160,956

LENS BARREL WITH SCREW MOUNT

Kenji Watanabe; Tetsuo Sekiguchi, and Takayasu Shishido, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 4, 1991, Ser. No. 637,645
Claims priority, application Japan, Jan. 17, 1990, 2-7917
Int. Cl.[5] G03B *17/00*
U.S. Cl. 354—286 **18 Claims**



1. A lens barrel having a screw mount comprising:
a mount ring having a threaded portion engagable by a corresponding screw mount of a camera body to which the lens barrel is to be attached;
a focus adjusting ring which is rotatably supported by said mount ring;
a barrel body which is screw-engaged by said focus adjusting ring to support a focus adjusting lens;
a linear movement guide member which is rotatably supported by said mount ring to restrict the movement of said barrel body so as to move only in the optical axis direction of the focus adjusting lens; and,
frictional resisting means for resisting the rotational movement of said linear movement guide member relative to said mount ring;
said frictional resisting means providing a resistance so that when the focus adjusting ring is rotated, no rotation of said linear movement guide member relative to said mount ring takes place, and when the rotational force is applied to said barrel body, said linear movement guide member can be rotated relative to said mount ring.

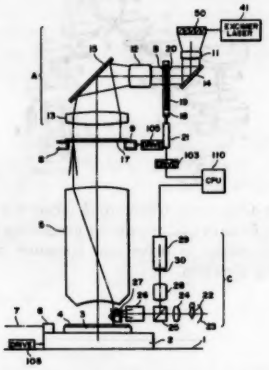
5,160,957

ALIGNMENT AND EXPOSURE APPARATUS

Hideki Ina, Kawasaki; Masao Kosugi, Yokohama, and Akiyoshi Suzuki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, 5 07221992 10 099 11031992 JPX Japan 05091986 61-104843 27 1 1 Rutledge; D. Adams; Russell E. 7 10 20

Continuation of Ser. No. 692,980, Apr. 29, 1991, abandoned, which is a continuation of Ser. No. 481,695, Feb. 20, 1990, abandoned, which is a continuation of Ser. No. 273,149, Nov. 18, 1988, abandoned, which is a continuation of Ser. No. 46,446, May 6, 1987, abandoned. This application Nov. 19, 1991, Ser. No. 795,252
Claims priority, application Japan, May 9, 1986, 61-104843
Int. Cl.[5] G03B *27/42, 27/53*
U.S. Cl. 355—43 **27 Claims**

1. A mark detecting device usable in an alignment and exposure apparatus for aligning an alignment mark of a mask with an alignment mark of a wafer and for exposing a resist material layer provided on the surface of the wafer to a pattern of the mask with radiation, said device comprising:
latent image forming means forming a latent image of the alignment mark of the mask on the resist material layer provided on the surface of the wafer by use of first radiation from a radiation source;
removing means for removing at least a portion of the resist material layer on the alignment mark of the wafer by use of second radiation from a radiation source; and



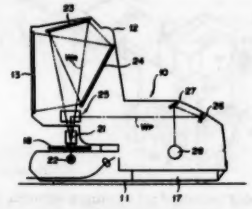
means for detecting the alignment mark of the wafer, the resist material of which has been at least partially removed by the irradiation with the second radiation, and the latent image of the alignment mark of the mask formed by said latent image forming means,
wherein said first radiation and said second radiation are supplied from a common radiation energy source.

5,160,958

IMAGE PROJECTING APPARATUS

Atsushi Shirota, Machida, Japan, assignor to Minolta Camera Co., Ltd., Osaka, Japan

Continuation of Ser. No. 668,581, Mar. 13, 1991, abandoned. This application Nov. 22, 1991, Ser. No. 799,736
Claims priority, application Japan, Mar. 14, 1990, 2-63394
Int. Cl.[5] G03B *13/28*
U.S. Cl. 355—45 **15 Claims**



1. An image projecting apparatus capable of selectively projecting light through an image in a microfilm onto a screen and onto an image-carrying member, comprising:
conveying means for conveying copying paper to the image-carrying member;
projecting means for projecting the image light onto the screen;
a scanning mirror, capable of being shakably moved around an axis parallel to the direction in which said conveying means conveys a copying paper, for scanning the image for reflection in a direction perpendicularly intersecting the direction of conveyance by thrusting the scanning mirror into the light path;
a reflecting mirror for reflecting the image light reflected by said scanning mirror on the image-carrying member; and
moving means for selectively moving said scanning mirror

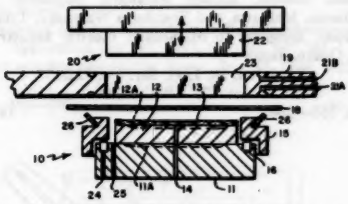
to a first position allowing said scanning mirror to be thrust into the light path of said projecting means and a second position allowing said scanning mirror to retract from said light path of said projecting means.

5,160,959

DEVICE AND METHOD FOR THE ALIGNMENT OF MASKS

Patrick N. Everett, Concord; William F. Delaney, Millville, and Marsden P. Griswold, Ashland, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Dec. 9, 1991, Ser. No. 809,644
Int. Cl.[5] G03B *27/42*
U.S. Cl. 355—53 **7 Claims**



1. A device for aligning a mask with a substrate, said device comprising

first means for holding a substrate

second means for holding a mask;

means for moving said first and second means toward and away from each other to bring an exposed surface of said mask into contact with an exposed surface of said

said first means including

mounting means on which said substrate is mounted;

surround means adjacent said mounting means for providing a surface surrounding the exposed surface of said substrate; and

flexible means on which said surround means is flexibly mounted;

whereby, when said moving means moves said first and second means toward each other, the exposed surface of said mask is brought into contact with, and lies in the same plane as, the exposed surface of said substrate and the exposed surrounding surface of said flexibly mounted surround means.

5,160,960

METHOD OF TRANSPORTING A PHOTOSENSITIVE SHEET

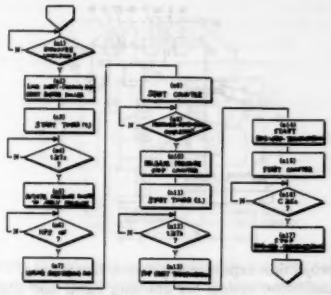
Yoshiaki Ibuchi, Nara, and Akira Tamagaki, Soraku, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 14, 1991, Ser. No. 699,888
Claims priority, application Japan, May 15, 1990, 2-124587
Int. Cl.[5] G03B *27/52, 27/32*
U.S. Cl. 355—27 **6 Claims**

1. A method of transporting a photosensitive sheet in an image forming apparatus, wherein the photosensitive sheet is first drawn out from a sheet-feeding rod and transported forward through an exposure section where it is subjected to an exposure process to have a latent image formed thereon, and then the portion of the photosensitive sheet having the latent image thereon is transported forward into a pressure-developing section where at the same time an image receiving sheet is also supplied to be pressed against the photosensitive sheet so that the latent image is developed and transferred onto the image receiving sheet through a pressure-developing process, and thereafter the photosensitive sheet is further transported forward to allow the image receiving sheet to be separated therefrom,

said method comprising the steps of measuring the length of the photosensitive sheet which is drawn out from the sheet feeding rod in the pressure-developing process, and transporting the photosensitive sheet by said measured length backward toward the sheet-feeding rod after the image receiving sheet is separated from the photosensitive sheet;

wherein the forward transportation of the photosensitive sheet through the exposure section is performed by the movement of a transporting means away from its home position, and the forward transportation of the photosensitive sheet through the pressure developing section is first performed by the backward movement of the transporting means toward its home position and then performed by drawing out the photosensitive sheet from the sheet-feeding rod, said step of measuring the length of the photosensitive sheet drawn out from the sheet feeding rod being allowed to start at the time when the transporting means reaches its home position and to stop at the end of the pressure-developing process.

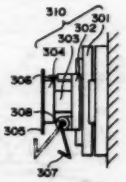


5,160,961

SUBSTRATE HOLDING DEVICE

Mitsuji Marumo, Sagamihara; Kazunori Iwamoto, Yokohama; Nobutoshi Mizusawa, Yamato; Takao Kariya, and Shunichi Uzawa, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1991, Ser. No. 672,636
Claims priority, application Japan, Mar. 23, 1990, 2-071886
Int. Cl.[5] G03B *27/42*
U.S. Cl. 355—53 **19 Claims**



1. A device for holding a substrate, comprising:

holding means for holding a substrate by attraction;

guard means for preventing dropping of the substrate held by said holding means, said guard means being out of contact with the substrate when the substrate is held by said holding means;

means for detecting presence/absence of the substrate at a substrate holding position on said holding means; and

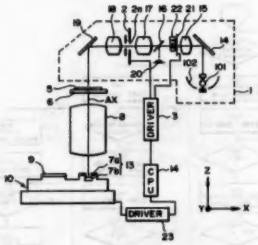
positioning means for positioning said guard means for the drop prevention in accordance with the detection by said detecting means.

5,160,962

PROJECTION EXPOSURE APPARATUS

Seiya Miura, Isehara, and Akiyoshi Suzuki, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 17, 1991, Ser. No. 642,408
Claims priority, application Japan, Jan. 17, 1990, 2-7889
Int. Cl.[5] G03B 27/42
U.S. Cl. 355—53 11 Claims



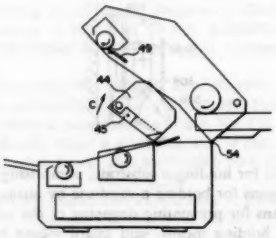
1. A projection exposure apparatus, comprising:
an illumination system for emitting light, said illumination system comprising a masking mechanism having an aperture of variable shape;
a projection optical system for receiving the light emitted from said illumination system;
a photoreceptor disposed adjacent to an image plane of said projection optical system for receiving light from a produced light pattern; and
an adjuster for adjusting said masking mechanism by reducing the size of said aperture and shifting the position of said aperture to produce, by utilizing said projection optical system, a relatively small light pattern on the image plane and to displace the produced light pattern along the image plane, such that said photoreceptor receives light from the produced light pattern.

5,160,963

IMAGE FORMING APPARATUS HAVING PROCESS CARTRIDGE

Satoshi Haneda; Shizuo Morita; Masakazu Fukuchi, and Shunji Matsuo, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Dec. 26, 1990, Ser. No. 634,068
Claims priority, application Japan, Jan. 11, 1990, 2-4300; Jan. 12, 1990, 2-5800; Jan. 12, 1990, 2-5801
Int. Cl.[5] G03G 15/00
U.S. Cl. 355—200 4 Claims



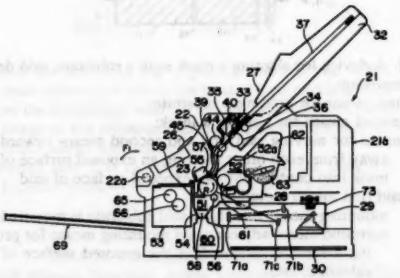
1. An apparatus for forming an image comprising:
a first group comprising, a rotatable image carrier on which an electrostatic latent image is formed; a charger for charging said image carrier; and a developer for developing said latent image into a toner image; and
a second group comprising, a transferer for transferring said toner image to a recording sheet; a sheet passage for passing said recording sheet through said transferer, and a toner container for storing toner therein,
said second group being disposed above said first four in a cartridge, said cartridge comprising an upper housing in which said transferer and said toner container are detachable installed, and a lower housing in which said first group is installed, and wherein said upper housing is mounted on said lower housing and adapted to pivot between an open position and a closed position.

5,160,964

IMAGE RECORDING APPARATUS OCCUPYING A MINIMUM AMOUNT OF SPACE

Hideki Takahashi, Moriguchi; Shigemitsu Tani, Hirakata; Akira Fukano, Katano; Kazuto Katakura, Suginami; Hitoshi Makimoto, Ichikawa, and Yoshikazu Watanabe, Tanashi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 28, 1991, Ser. No. 722,677
Int. Cl.[5] G03G 15/00
U.S. Cl. 355—200 18 Claims



1. An image recording apparatus having feeding means for feeding sheets of paper one by one; process means for performing an electrophotographic process, which include means for sensitizing a photosensitive drum, means for forming an electrostatic latent image on the photosensitive drum, means for developing the electrostatic latent image with toner, and means for transferring a developed image to a sheet of paper fed by the feeding means; fixing means for fixing a transferred image onto the sheet; optical means for irradiating the photosensitive drum; and a delivery tray, wherein the feeding means, the process means, and the fixing means are arranged in a main body in this order on a path along which a sheet is conveyed, the image recording apparatus characterized in that:
the feeding means are positioned in an upper portion of the main body, and the process means and the fixing means both are positioned diagonally below and forward of the feeding means such that a paper path connecting the feeding means and the fixing means descends forward;
the process means include a photosensitive drum constituted from a conductive body covered with a photoconductive layer, a charger for applying charges to a surface of the photosensitive drum so that an electrostatic latent image is formed on the photosensitive drum when the photosensitive drum is irradiated with light rays emitted from said optical means, a single developer only for developing the electrostatic latent image on the photosensitive drum with toner, a toner cartridge for supplying toner to the single developer, a transferrer for applying charges opposite in polarity to the charges of the photosensitive drum to a sheet so that toner defining a developed image on the photosensitive drum is attracted to the sheet, and a cleaner for removing residual toner on the photosensitive drum;
all of the components of the process means are integrated into a single unit which is detachable from the main body;
said single unit being composed of first and second subunits

which are separable from each other, said first subunit includes the single developer and the toner cartridge and the second subunit includes the photosensitive drum, the charger, the transferrer, and the cleaner, wherein said toner cartridge is separable from said first subunit

said main body has a front cover which can be freely opened and closed, and a storage container attached to an inner surface of said front cover and having an opening for placing items within and removing items from said container.

5,160,965

IMAGE FORMING APPARATUS WITH SMALL LED ARRAY

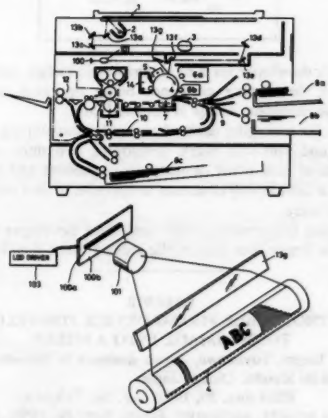
Jun Koide, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 471,474, Jan. 29, 1990, abandoned. This application Dec. 17, 1991, Ser. No. 807,744

Claims priority, application Japan, Jan. 30, 1989, 1-22291

Int. Cl.[5] G03G *15/04*

U.S. Cl. 355—202 **46 Claims**



1. An image forming apparatus comprising:

an image carrying member;

an LED (light emitting diode) array having a plurality of light-emitting units arranged in correspondence with the longer direction of said image carrying member, the width of said LED array being smaller than ann image carrying width of said image carrying member; and

projection means for magnifying and projecting light from said LED array upon said image carrying member.

5,160,966

APPARATUS FOR DETECTING TONER SHORTAGE IN DEVELOPING UNIT

Yoshio Shiina; Akihiko Kato; Toru Isosu; Makoto Kanno, and Akihiko Sato, all of Kanagawa, Japan, assignors to Fuji Xerox Corporation, Ltd., Tokyo, Japan

Filed Mar. 14, 1991, Ser. No. 669,621

Claims priority, application Japan, Mar. 19, 1990, 2-67328

Int. Cl.[5] G03G *15/08, 15/00*

U.S. Cl. 355—206 **7 Claims**

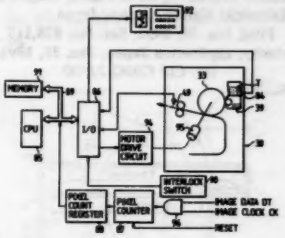
1. An apparatus for detecting toner shortage in a developing unit for use in an image recording system that forms a latent electrostatic image on a carrier by exposure to an image signal and that develops the latent electrostatic image to produce a recorded image formed of pixels, said apparatus comprising:

a container for holding toner;

toner shortage sensor means disposed in the container for detecting presence and absence of toner at a predetermined location in the container;

counter means for determining a cumulative total of recorded images and pixels produced by the image recording system,

wherein the counter means adds incrementally to the cumulative totals when the toner shortage sensor means detects the absence of toner at the predetermined location int he container, and



wherein the counter means subtracts incrementally from the cumulative totals when the toner shortage sensor means detects the presence of toner at the predetermined location in the container; and

control means governed by the counter means for stopping the operation of the image recording system when the cumulative total of either the recorded images or pixels reaches a respective predetermined value.

5,160,967

IMAGE FORMING APPARATUS WITH LAYER THINNING DETECTION

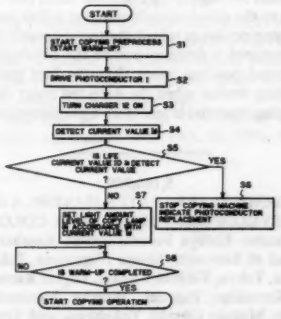
Tadashi Tonegawa, Shiki, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 13, 1991, Ser. No. 714,176

Claims priority, application Japan, Jun. 14, 1990, 2-156279; Mar. 18, 1991, 3-052591

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—208 **20 Claims**



8. An apparatus for forming an image of a document placed on a document table, capable of charging a photoconductor by using a charging device, said apparatus comprising:

means for detecting a vlaue of a flowing current into said photoconductor, said detecting means being capable of detecting said vlaue of said flowing current which is proportional to a capacitance of a photoconductive layer of said photoconductor;

means for comparing said value of said flowing current with a predetermined life time current value of said photoconductor; and

means for determining a layer thinning of said photoconduc-

tor at a time when said value of said flowing current exceeds said predetermined life time current value of said photoconductor so that said layer thinning is indicated.

5,160,968

DEVELOPING MEANS AND METHOD FOR SUPPLYING TONER TO A DENSITY DETECTION POSITION AND AT LEAST ONE OTHER POSITION

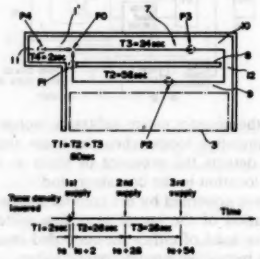
Motohiro Yamada; Mineo Yamamoto, both of Okazaki, and Koji Shakushi, Toyohashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 30, 1992, Ser. No. 828,117

Claims priority, application Japan, Jan. 31, 1991, 3-11172

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—208 **10 Claims**



1. An image forming apparatus comprising:

a developing device including a developing means for transporting developing material of a toner and a magnetic carrier to a developing region wherein the developing device confronts a photosensitive member, and a transport means for circularly transporting the developing material from a toner supply portion provided in the developing device to the developing means and from the developing means to the toner supply portion while mixing the developing material;

detecting means provided in the developing device for detecting a toner density of the developing material circulating in said developing device; and

supply means for supplying the toner from the toner supply portion to the developing material at a first position in the developing device at which the toner density of the developing material is detected and to the developing material at a second position other than the first position in the developing device when the detected toner density of the developing material is less than a predetermined standard density.

5,160,969

IMAGE FORMING APPARATUS HAVING A SEPARATE BLACK DEVELOPER STORED FOR A COLOR IMAGE

Kenichi Mizuma; Hideya Furuta; Nobuo Kasahara; Noriyuki Kimura, all of Kawasaki; Shinju Nagatsuna, Tokyo; Mitsuru Mamizuka, Tokyo; Yoshihiro Sakai, Toyko; Kazunori Bannai, Tokyo; Kazushige Taguchi, Warabi; Yasunori Kawaishi, Narashino; Makoto Ohsaki, Yokohama, and Tatsuo Hirono, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 542,887, Jun. 25, 1990, abandoned. This application May 29, 1991, Ser. No. 707,050

Claims priority, application Japan, Jun. 26, 1989, 1-163313; Dec. 26, 1989, 1-149486; Jun. 19, 1990, 2-158807; Jun. 26, 1990, 2-167930; May 8, 1991, 3-131684

Int. Cl.[5] G03G *15/01*

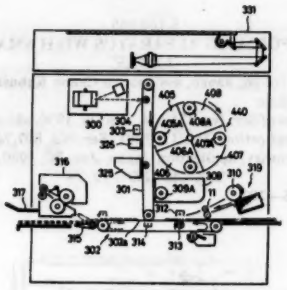
U.S. Cl. 355—326 **11 Claims**

1. An image forming apparatus comprising:

a plurality of color developing containers for developing an electrostatic latent image on a photosensitive body by toners having colors different from each other except for black;

a first black developing container for storing a first black developer for a color image, said first black developing container being operated when a developed image on said photosensitive body for every color is overlapped and transferred onto a transfer material to provide a color image;

a second black developing container for storing a second



black developer for a monochromatic image, said second black developing container being operated when the monochromatic image is obtained; and

means for arranging each of said color developing containers and said first black developing container such that each of said color developing containers and said first black developing container is opposite to said photosensitive body,

a melting temperature of the first black developer being set to be lower then that of the second black developer.

5,160,970

CONTROLLABLE FIXING DEVICE FOR FIXING A TONER IMAGE INTO A SHEET

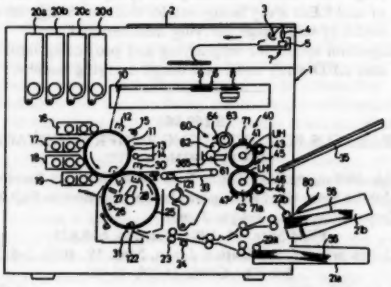
Mitsuru Isogai, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 20, 1991, Ser. No. 718,564

Claims priority, application Japan, Nov. 29, 1990, 2-335898; Nov. 29, 1990, 2-335899; Nov. 29, 1990, 2-335900

Int. Cl.[5] G03G *15/20, 21/00*

U.S. Cl. 355—284 **40 Claims**



mold releasing agent coating member for coating a mold releasing agent on said one of the fixing rollers;

warm-up means for executing a warm-up operation of said fixing rollers, said warm-up means including detecting means, which is in contact with said one of the fixing rollers, for detecting the temperature thereof, said warm-up means starting a warm-up operation in response to a power-on and terminating when the fixing rollers reach a predetermined temperature, and said warm-up operation including rotation of said fixing rollers; and

control means for operating the mold releasing agent coating means for a predetermined time during a warm-up time, wherein said control means terminates the operation of the mold releasing agent coating means before the termination of said warm-up operation.

5,160,971

DISTANCE MEASURING EQUIPMENT FOR A CAR

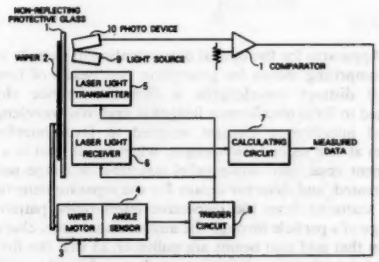
Toshifumi Koshizawa, Ebina, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Sep. 27, 1991, Ser. No. 766,134

Claims priority, application Japan, Sep. 28, 1990, 2-262664

Int. Cl.[5] G01N *21/00*

U.S. Cl. 356—5 **5 Claims**



1. Distance measuring equipment for a car having a non-reflecting protective glass with a wiper outside the car comprising:

first means provided inside the car for optically measuring a distance between the car and one of obstacles forward or backward of the car;

second means for optically detecting a condition where the non-reflecting protective glass reflects light and for providing an output;

third means for driving the wiper in response to the output of said second means upon the detection of the reflection condition

fourth means for detecting a driving angle of said third means; and

fifth means for interrupting the operation of said first means only when the driving angle of said third means resides within a range of a predetermined measuring angle of said first means.

5,160,972

APPARATUS FOR CONTROLLING DEPLOYMENT OF A CABLE

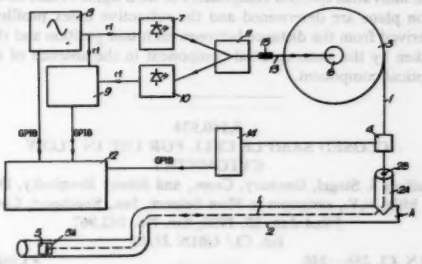
David L. Walters, Bishop's Stortford; Martin Healy, Harlow; Ernest C. Marlow, Sawbridgeworth, and David F. Harrison, Old Harlow, all of United Kingdom, assignors to STC PLC, London, England

Division of Ser. No. 594,389, Oct. 5, 1990, Pat. No. 5,090,665. This application Sep. 9, 1991, Ser. No. 756,580

Claims priority, application United Kingdom, Oct. 7, 1989, 8922643

Int. Cl.[5] G01B *11/16*; B65H *59/38*

U.S. Cl. 356—32 **2 Claims**



1. Apparatus for measuring strain in an optical cable during deployment from a storage drum, the cable being drawn from the drum by frictional force between the cable and a moving fluid, the apparatus comprising optical transmitter means for transmitting a modulated optical signal into the cable via a rotary optical joint, means for detecting a received signal from the cable via a reflective end termination at the end of the cable remote from the drum, means for comparing the transmitted optical signal with the reflected signal whereby to obtain a measure of strain in the cable, and means responsive to said strain measurement for controlling the rate of deployment of the cable from the storage drum such that the deployment rate is increased responsive to an increase in the measured strain and is decreased responsive to a decease in the measured strain.

5,160,973

SYSTEM FOR MEASURING THE REFRACTIVE INDEX PROFILE OF OPTICAL COMPONENTS

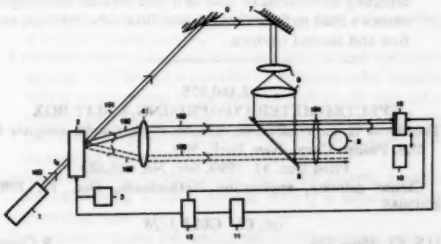
Giuseppe Cocito, S. Giusto, and Giorgio Greco, Venaria, both of Italy, assignors to CSELT - Centro Studi E Laboratori Telecomunicazioni S.p.A., Turin, Italy

Filed Oct. 18, 1991, Ser. No. 778,740

Claims priority, application Italy, Oct. 22, 1990, 67814 A/90

Int. Cl.[5] G01N *21/45*

U.S. Cl. 356—73.1 **9 Claims**



1. A method of measuring the refractive index profile of an optical component (9), wherein: a first basically monochromatic light beam (100) is generated comprising radiations at a first frequency; a second and a third basically monochromatic beam (101, 102) are obtained from the first beam, the second

beam having the same frequency as the first beam, and the third beam having a variable frequency different at any instant from the first frequency, being emitted in a direction varying in function of the frequency and being then collimated; radiations of the second beam (101) and of the collimated third beam (103), are sent towards the optical component (9); an electrical signal at said variable frequency is generated, representative of the beat between radiations which have passed through the optical component (9); and a spectral analysis of the electrical signal is carried out; characterized in that the radiations which have passed through the optical component (9) are collected on a detection plane located at constant and predetermined distance from the optical component (9), the positions taken by the individual spectral components of such signal in said detection plane are determined and the refractive index profile is derived from the distance between each said position and that taken by the same spectral component in the absence of the optical component.

5,160,974

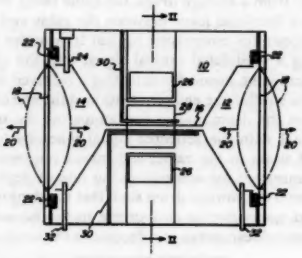
CLOSED SAMPLE CELL FOR USE IN FLOW CYTOMETRY

Jeffrey I. Siegel, Danbury, Conn., and Sidney Braginsky, Dix-hills, N.Y., assignors to Flow Science, Inc., Southport, Conn.

Filed Jun. 25, 1990, Ser. No. 542,967

Int. Cl.[5] G01N *21/03*

U.S. Cl. 356—246 **3 Claims**



1. A closed flow cell for use in flow cytometry comprising:
a body;
said body having a first cavity therein;
said body having a second cavity therein;
a flow tube connecting said first and second cavity;
a first diaphragm sealing said first cavity;
a second diaphragm sealing said second body;
detector means, associated with said flow tube, for detecting predetermined properties of particles in suspension;
a charge injector in said first and second cavity; and
a transparent electrode positioned adjacent said flow tube, whereby movement of said first and second diaphragms causes a fluid to flow through said flow tube between said first and second cavities.

5,160,975

SPECTROMETER COMPRISING A SLIT BOX

Theodorus G. L. Wiefferink, Almelo, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

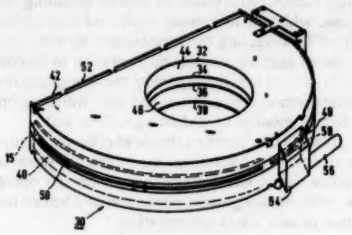
Filed Dec. 11, 1990, Ser. No. 626,083

Claims priority, application Netherlands, Dec. 12, 1989, 8903045

Int. Cl.[5] G01J *3/28*

U.S. Cl. 356—326 **9 Claims**

1. A spectrometer, comprising a housing for optical elements, an entrance slit and an exit slit, characterized in that a support for an entrance slit and an exit slit is constructed as a rigid box which has the shape of a sector of circle and which consists of plates and side walls having a sector of circle shape including a circular-cylindrical wall on which an exactly circular abutment face is provided which includes slots, the rigid



box being constructed of two axially stacked compartments between which the slots are provided.

5,160,976

OPTICAL DETERMINATION OF VELOCITY USING CROSSED INTERFERENCE FRINGE PATTERNS

Robert J. G. Carr; David J. Clarke, and Sumaia Al-Shukri, all of Wiltshire, England, assignors to Public Health Laboratory Service Board, London, United Kingdom

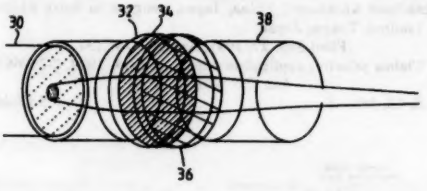
Continuation of PCT/GB89/01336, Nov. 10, 1989, abandoned.

This application Jul. 9, 1991, Ser. No. 727,428

Claims priority, application United Kingdom, Nov. 11, 1988, 8826487

Int. Cl.[5] G01B *9/02*

U.S. Cl. 356—349 **11 Claims**



1. Apparatus for the optical determination of particle velocity, comprising means for generating two beams of first and second distinct wavelengths; a first interference element adapted to form interference fringes at said first wavelength, a second interference element adapted to form interference fringes at said second wavelength, whereby, at least in a measurement zone, two non-parallel interference fringe patterns are created; and detector means for the separate detection of light scattered from the respective interference patterns on passage of a particle through the measurement zone, characterised in that said two beams are collinear, in that the first and second interference elements are disposed in the collinear beam path, in that the first interference element is adapted to transmit or reflect said second wavelength substantially uniformly and in that the second interference element is adapted to transmit or reflect said first wavelength substantially uniformly.

5,160,977

POSITION DETECTION DEVICE

Noriyuki Utsumi, Yokohama, Japan, assignor to Tokico, Ltd., Japan

Filed Jan. 18, 1991, Ser. No. 644,115

Claims priority, application Japan, Jan. 19, 1990, 2-9541

Int. Cl.[5] G01B *11/00*

U.S. Cl. 356—376 **12 Claims**

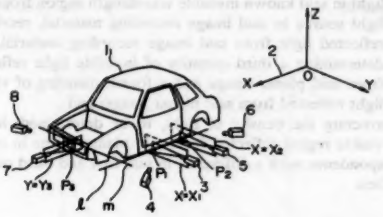
1. A position detection device for detecting the position in a work space of an object having at least two non-parallel straight edges comprising:

a) first position detection means for detecting a point of

intersection of a line containing a first straight edge of the workpiece and a first detection plane defined within the work space;

b) second position detection means for detecting the point of intersection of a line containing a second straight edge of the workpiece which is different from said first straight edge and a second and a third detection plane defined within said work space;

c) first storage means for storing first coordinates representing the geometric relationship between said first straight edge and said second straight edge,



d) second storage means for storing second coordinates of said first, second, and third detection planes; and

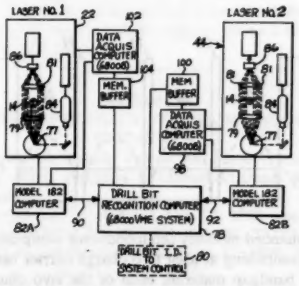
e) computational means for calculating the three dimensional position and orientation of said workpiece based on the first coordinates stored in said first storage means, the second coordinates stored in said second storage means and the coordinates of the points of intersection detected by said first position detection means and said second position detection means.

5,160,978

AUTOMATED DRILL BIT RECOGNITION SYSTEM

Paul E. Faville, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 29, 1991, Ser. No. 706,961
Int. Cl.[5] G01B *11/02, 11/08*
U.S. Cl. 356—394 **16 Claims**



1. A drill bit recognition system, comprising:

a drill bit feed track operable to sequentially convey drill bits along a certain path;

first scanner means positioned along an upstream portion of said track, and operable to at least provide data sufficient to determine the end-to-end orientation of each bit as it passes through said upstream portion;

a flipper mechanism positioned along said path downstream of said scanner means, said flipper mechanism including means selectively operable to reverse the end-to-end orientation of any one of said bits;

second scanner means positioned along a downstream portion of said track, and downstream of both said first scanner means and said flipper mechanism, said second scanner means being operable to at least provide a plurality of crosswise diameter scans taken at spaced positions along the length of each bit as said bit passes through said second scanner means; and

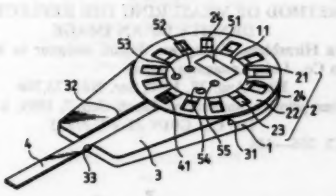
a drill bit recognition computer, operatively connected to said first scanner means, said flipper mechanism and said second scanner means, and programmed to selectively operate said flipper mechanism in response to the data provided by said first scanner means, and further, said computer being programmed to recognize the diameter, shank type, flute characteristics and length of each bit from said crosswise diameter scans, to identify the type of each bit for later sorting after each bit exits said feed track.

5,160,979

TEST PIECE COLORATION COMPARATIVE DECISION UNIT

Hiroyuki Ota; Takao Terada, both of Osaka, Japan; Bernd G. Herpichboehm; George H. Sierra; Robert B. Summers, and Thomas M. Watlington, all of Indianapolis, Ind., assignors to Omrom Corp., Kyoto, Japan and Boehringer Mannheim Corp., Indianapolis, Ind.

Continuation of Ser. No. 534,340, Jun. 6, 1990, abandoned, which is a continuation of Ser. No. 224,367, Jul. 26, 1988, abandoned. This application Feb. 8, 1991, Ser. No. 652,487
Claims priority, application Japan, Jul. 27, 1987, 62-187322
Int. Cl.[5] G01J *3/52*
U.S. Cl. 356—423 **8 Claims**



1. A color comparative decision apparatus comprising:

a stationary mounting member having an area for mounting a coloration test sample;

a rotatable color sample member mounted on said stationary member and having a plurality of different color samples which are arranged in the form of a circle on said color sample member, said color samples being successively movable to a position adjacent said mounting area, upon rotation of said color sample member;

means responsive to rotation of said color sample member for identifying a color sample which is adjacent said mounting area;

first memory means for storing values representing each of said different color samples; and

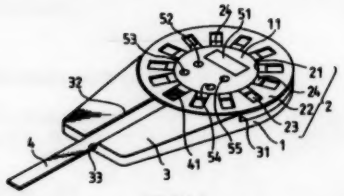
display means for displaying a stored color sample value corresponding to a color sample which is identified by said identifying means as being adjacent said mounting area.

5,160,980

TEST PIECE COLORATION COMPARATIVE DECISION UNIT

Bernd G. Herpichboehm, George H. Sierra, Robert B. Summers, and Thomas M. Watlington, all of Indianapolis, Ind., assignors to Boehringer Mannheim Corp., Indianapolis, Ind.

Continuation of Ser. No. 534,341, Jun. 6, 1990, abandoned, which is a continuation of Ser. No. 376,561, Jul. 7, 1989, abandoned, which is a division of Ser. No. 224,367, Jul. 26, 1988, abandoned. This application Feb. 8, 1991, Ser. No. 652,486
Claims priority, application Japan, Jul. 27, 1987, 187322
The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.
Int. Cl.[5] G01J 3/52
U.S. Cl. 356—423 6 Claims



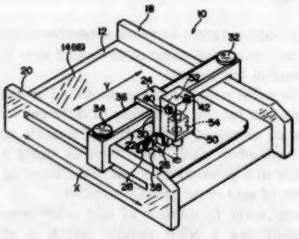
1. A colorimeter for converting a color output to an electrical signal comprising a color chart having a plurality of reference colors for comparing to a color which is to be converted, means for generating an electrical signal which corresponds to a favorable comparison of the color which is to be converted to the reference colors on the color chart; and means for locating the color chart with respect to the means for generating an electrical signal so that the means for generating can generate an electrical signal corresponding to said favorable comparison.

5,160,981

METHOD OF MEASURING THE REFLECTION DENSITY OF AN IMAGE

Takuya Hirashima, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 28, 1990, Ser. No. 573,766
Claims priority, application Japan, Sep. 7, 1989, 1-232026
Int. Cl.[5] G01N 21/47, 21/55
U.S. Cl. 356—446 11 Claims



1. A method of measuring a reflected density of an image for measuring the density of light in a visible region reflected from a planar image recorded on an image-recording material not exhibiting spectral absorption in a known invisible region, comprising the steps of:

placing in a predetermined plane a reference calibration plate whose reflection densities for known wavelengths are already known and which does not exhibit spectral absorption in said known invisible region;

applying a beam of light including light in the visible region and light in said known invisible region from a light source to said reference calibration plate, receiving reflected light from said reference calibration plate, and determining a first quantity of invisible reflected light and a second quantity of visible reflected light corresponding to said known density; and

removing said calibration plate and disposing said image recording material in said predetermined plane, applying said beam of light including light in the visible region and light in said known invisible wavelength region from said light source to said image recording material, receiving reflected light from said image recording material, and determining a third quantity of invisible light reflected from said planar image and a fourth quantity of visible light reflected from said planar image; and

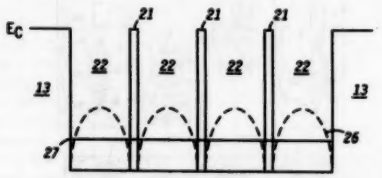
correcting the density of light, to be determined, in the visible region reflected from said planar image in correspondence with a difference in said first and third quantities.

5,160,982

PHONON SUPPRESSION IN QUANTUM WELLS

Herbert Goronkin, Tempe; X. Theodore Zhu, Chandler, and George N. Maracas, Tempe, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 724,014, Jul. 1, 1991, abandoned. This application Jun. 8, 1992, Ser. No. 895,228
Int. Cl.[5] H01L 27/12, 29/161, 33/00
U.S. Cl. 257—23 12 Claims



1. An enhanced mobility semiconductor comprising: a quantum well comprising at least two charge carrier barrier layers of a wide bandgap material, each of the two charge carrier barrier layers being separated by a conductive layer containing charge carriers, wherein each conducting layer is at least ten monolayers thick; and

a number of phonon barriers having a predetermined thickness formed in the conducting layer, wherein the predetermined thickness is chosen to allow charge carrier tunneling through the phonon barriers and the phonon barriers comprise a material having a substantially different elastic constant than the conducting layer, wherein the phonon barriers are separated from each other by a predetermined spacing chosen to minimize charge carrier interaction with phonons in the conducting layer and with interface phonons generated at an interface between the phonon barriers and the conducting layer.

5,160,983

SUPERCONDUCTING DEVICE

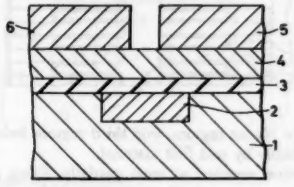
Yutaka Harada, Kodaira; Shinichiro Yano, Hachioji; Mutsuko Miyake, Urawa; Ushio Kawabe, Nishitama, and Toshikazu Nishino, Kawasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 201,332, May 31, 1988, Pat. No. 4,888,629, which is a continuation of Ser. No. 724,764, Apr. 18, 1985, abandoned. This application Nov. 21, 1989, Ser. No. 439,809

Claims priority, application Japan, Apr. 19, 1984, 59-77563; Sep. 21, 1984, 59-196830

Int. Cl.[5] H01L *39/22*

U.S. Cl. 257—34 18 Claims



1. A superconducting device comprising:

a semiconductor region;

a pair of superconducting electrodes located at a first side of said semiconductor region to be separated from one another, said superconducting electrodes being coupled by a superconducting weak link through said semiconductor region; and

means for controlling superconducting current flowing through said semiconductor region between said superconducting electrodes, wherein said controlling means is located at a second side of said semiconductor region, and wherein said semiconductor region is comprised of a semiconductor material having a first conductivity type, and said controlling means is comprising of a semiconductor material having a second conductivity type opposite to said first conductivity type to form a junction between said semiconductor region and said controlling means so that said superconducting current is prevented from flowing from said semiconductor region into said controlling means by said junction.

5,160,984

AMPLIFYING FEEDBACK FET SEMICONDUCTOR ELEMENT

Mitsuru Mochizuki; Tadashi Takagi, and Shuji Urasaki, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 485,171, Feb. 26, 1990, abandoned. This application Jul. 19, 1991, Ser. No. 732,934

Claims priority, application Japan, Mar. 17, 1989, 1-66901

Int. Cl.[5] H01L *29/812*

U.S. Cl. 257—277 12 Claims

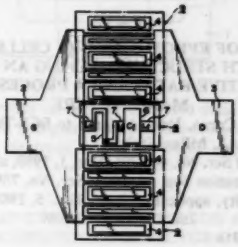
1. An amplifying feedback-type FET semiconductor element comprising:

(a) first and second FET transistor elements each including a plurality of substantially planar parallel FET cells disposed on a semiconductor substrate, and including source, drain and gate electrodes mounted on said substrate, each of the first and second FET transistor elements also having an input end and an output end;

(b) a drain lead electrode extending from said drain electrode of each said FET cell and disposed on said substrate at the respective output end of said first and second FET transistor elements;

(c) a gate lead electrode extending from said gate electrode of each said FET cell and disposed on said substrate at the respective input end of said first and second FET transistor elements; and

(d) a feedback circuit coupled between said gate lead electrode and said drain lead electrode comprising at least one passive element, a first connecting line coupling between said gate lead electrode and said at least one passive element, a second connecting line coupling between said at



least one passive element and said drain lead electrode, said feedback circuit disposed in substantially the same plane as said first and second FET transistor elements, said gate lead electrode, and said drain lead electrode, and said feedback circuit additionally disposed between said first and second FET transistor elements;

whereby the total length of said connecting lines is reduced to a minimum.

5,160,985

INSULATED GATE BIPOLAR TRANSISTOR

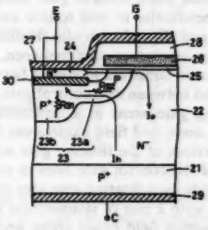
Hajime Akiyama, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 25, 1989, Ser. No. 342,902

Claims priority, application Japan, Jan. 6, 1989, 1-1507

Int. Cl.[5] H01L *29/10, 29/78*

U.S. Cl. 257—145 14 Claims



1. An insulated gate bipolar transistor comprising:

a first conductivity type of first semiconductor layer having first and second major surfaces;

a second conductivity type of second semiconductor layer formed on said first major surface of said first semiconductor layer;

a first conductivity type first semiconductor region formed in a surface of said second semiconductor layer;

a second conductivity type first semiconductor region formed in a surface of said first semiconductor region;

an insulation film formed on the surface of said first semiconductor region between surfaces of said second semiconductor layer and said second semiconductor region;

a control electrode formed on said insulation film;

a first main electrode formed on said second semiconductor region;

a second main electrode formed on said second major surface of said first semiconductor layer;

a buried electrode formed in a boundary portion between

said first and second semiconductor regions to cover almost an entire bottom of said second semiconductor region;

a conductor layer for electrically connecting said buried electrode with said first main electrode; and

wherein said second semiconductor region has provided at a portion thereof a contact hole in which said conductor layer is formed.

5,160,986

MATRIX OF EPROM MEMORY CELLS WITH A TABLECLOTH STRUCTURE HAVING AN IMPROVED CAPACITATIVE RATIO AND A PROCESS FOR ITS MANUFACTURE

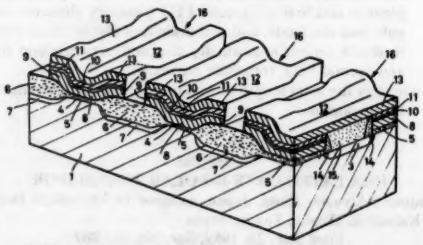
Orio Bellezza, Curno, Italy, assignor to SGS-Thomson Microelectronics s.r.l., Milan, Italy

Continuation of Ser. No. 444,796, Dec. 1, 1989, abandoned. This application Sep. 11, 1991, Ser. No. 759,203

Claims priority, application Italy, Dec. 5, 1988, 22848 88

Int. Cl.[5] H01L *29/68*

U.S. Cl. 257—316 **1 Claim**



1. A matrix of EPROM memory cells comprising a semiconductor substrate, source lines and drain lines parallel to and alternated with one another on said substrate, floating gate areas interposed in a checkerboard pattern between said source lines and said drain lines, control gate lines parallel to one another and perpendicular to said source and drain lines and superimposed to and aligned with said floating gate areas with a dielectric being interposed therebetween, and field oxide areas formed on said substrate in spaces between said source and drain lines and between said control gate lines and aligned with said floating gate areas in a direction parallel to said source and drain lines, said field oxide areas further extending below lateral portions of the floating gate areas and superimposed portions of the control gate lines in said parallel direction so as to provide each floating gate area and corresponding control gate line with a pair of symmetrical lateral fins superimposed to respective field oxide areas, and said field oxide areas are aligned with said floating gate areas and said source and drain lines in a direction perpendicular to said control gate lines.

5,160,987

THREE-DIMENSIONAL SEMICONDUCTOR STRUCTURES FORMED FROM PLANAR LAYERS

Wilber D. Pricer, Burlington; Thomas B. Faure, Milton, both of Vt.; Bernard S. Meyerson, Yorktown Heights, N.Y.; William J. Nestork, Hinesburg, and John R. Turnbull, Jr., Shelburne, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 427,679, Oct. 26, 1989, abandoned. This application Feb. 15, 1991, Ser. No. 656,902

Int. Cl.[5] H01L *29/78, 23/48, 29/46, 29/34*

U.S. Cl. 257—307 **16 Claims**

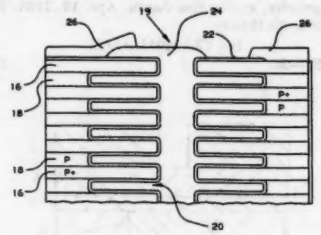
1. A semiconductor device comprising:

a substantially planar substrate including a surface having an orientation parallel to a first plane;

a plurality of first planar regions of a first material formed in vertical spaced relationship to and above said surface;

a plurality of second planar regions of conductive material formed above said surface, each second planar region vertically interleaved between adjacent first planar regions;

a plurality of third planar regions formed laterally adjacent to said second planar regions and vertically between adjacent first planar regions, said third regions being defined substantially by said first material;



a conductive member at least partially filling said third regions, said conductive member being insulatingly spaced from said first and second planar regions; and

at least one coupling region, passing through at least some of said first regions, said coupling region including at least one conductor.

5,160,988

SEMICONDUCTOR DEVICE WITH COMPOSITE SURFACE INSULATOR

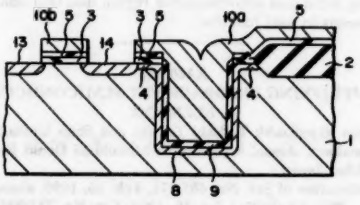
Takayoshi Higuchi, Sendai, and Soulchi Sugiura, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 388,035, Aug. 1, 1989, abandoned. This application Feb. 25, 1991, Ser. No. 657,934

Claims priority, application Japan, Aug. 3, 1988, 63-193865

Int. Cl.[5] H01L *29/68, 27/02, 29/34*

U.S. Cl. 257—301 **10 Claims**



1. A semiconductor device, comprising:

a substrate;

a capacitor formed in said substrate and having first and second insulation layers and a conductive layer, said first insulation layer being on at least a portion of a surface of said substrate, including a peripheral portion of said capacitor, said second insulation layer being a dielectric material of said capacitor and having a thickness less than that of said first insulation layer, and the conductive layer being on the second insulation layer;

drain and source layers in first and second portions of the substrate not covered by either said first insulation layer or said second insulation layer;

a third insulation layer on a third portion of the substrate between the first and second portions of the substrate; and

a gate layer on the third insulation layer;

wherein said first insulation layer comprises a lower layer

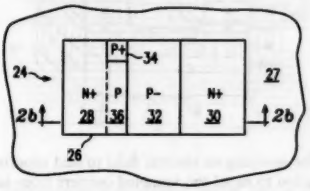
and an upper layer, said upper layer comprising a silicon nitride film.

5,160,989

EXTENDED BODY CONTACT FOR SEMICONDUCTOR OVER INSULATOR TRANSISTOR

Theodore W. Houston, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 13, 1989, Ser. No. 365,390
Int. Cl.[5] H01L *27/01, 29/10*
U.S. Cl. 257—347 **44 Claims**



1. A transistor, comprising:
an insulating layer;
a semiconductor mesa having a base adjacent said insulating layer and a top opposite said base, said semiconductor mesa comprising:
a source region within said semiconductor mesa, said source region of a first conductivity type;
a drain region within said semiconductor mesa, said drain region of said first conductivity type;
a body region in contact with said insulating layer and extending to the top of said mesa and located between said source and drain regions, said body region of a second conductivity type and of a first dopant level;
a first contact region of resistivity lower than that of said body region disposed along substantially the entire width of said body region and adjacent said source region and said body region, said first contact region in contact with said insulating layer and underlying at least a portion of said source region and extending substantially no farther toward said body region than the junction between said source region and said body region;
a segment region between said source region and said insulating layer, and further contacting said first contact region; and
a vertical contact region adjoining said segment region and extending toward said top of said semiconductor mesa.

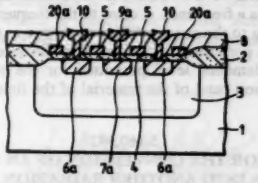
5,160,990

MIS-FET WITH SMALL CHIP AREA AND HIGH STRENGTH AGAINST STATIC ELECTRICITY

Nobuhiko Osawa, Yamanashi, Japan, assignor to Pioneer Electronic Corporation, Tokyo and Pioneer Video Corporation, Yamanashi, both of, Japan

Filed Dec. 20, 1988, Ser. No. 286,817
Claims priority, application Japan, Jan. 21, 1988, 63-11512
Int. Cl.[5] H01L *29/06*
U.S. Cl. 257—355 **34 Claims**

1. A metal insulated semiconductor field effect transistor (MIS-FET), comprising:
a substrate region;
a semiconductor layer of a predetermined conductivity type formed in a portion of said substrate region;
a source region and a drain region formed separately from each other within said semiconductor layer;
an insulator film formed on a surface of said semiconductor layer;
a source electrode in contact with said source region;
a gate electrode formed on said film between said source region and said drain region; and



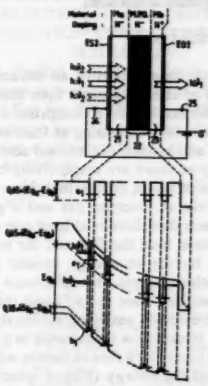
a further electrode on said film near said drain region, not in contact with said gate electrode and connected to one of said source electrode and said substrate region.

5,160,991

ELECTROMAGNETIC WAVE DETECTOR AND IMAGE ANALYZER COMPRISING A DETECTOR OF THIS TYPE

Dominique Delacourt, Paris; Michel Papuchon, Massy, and Jean-Paul Pocholle, Arpajon, all of France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 219,363, Jul. 15, 1988, abandoned. This application Sep. 23, 1991, Ser. No. 764,096
Claims priority, application France, Jul. 17, 1987, 87 10121
Int. Cl.[5] H01L *27/14, 31/04; G02B 6/12*
U.S. Cl. 250—338.4 **5 Claims**



1. An apparatus for detecting an electromagnetic wave having a frequency ν_1, said apparatus comprising:
at least one first layer of semiconductive material of a first type which is crossed said wave;
at least two second layers, each first layer being placed between two second layers and these second layers consisting of a semiconducting material of a second type, these two types of material being such that there is a potential wall in the conduction band and in the valence band of each first layer; the thickness of each first layer being such that the electrons of the conduction band of each first layer have at least one permitted discrete level of energy such that the difference in energy between this layer and the bottom of the conduction band in the second layers is smaller than or equal to the energy corresponding to the frequency ν_1 of said electromagnetic wave; said level being populated by electrons;
two electrodes to apply an electrical field to all the first and second layers and to collect an electrical current depending on the amplitude of said wave;
wherein the fist and second layers have a doping which is as low as possible and wherein, the conduction band of each

first layer has a fundamental discrete level which is populated with electrons, said apparatus further comprising a means for generating a control wave for illuminating said conduction band of each first layer wherein said control wave has a frequency ν_2 close to the frequency $\nu_2 O$ corresponding to the energy difference between the fundamental level permitted for the holes in the valence band and the fundamental level permitted for the electron in the conduction band of the material of the first type.

5,160,992

DEVICE FOR THE CONVERSION OF AN INFRARED RADIATION INTO ANOTHER RADIATION OF ENERGY GREATER THAN THAT OF THIS INFRARED RADIATION

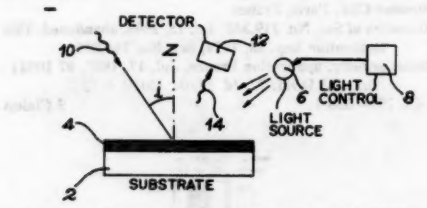
Jean-Michel Gerard, Paris, and Jean-Yves Marzin, Orsay, both of France, assignors to Minister of Post, Telecommunications and Space, France

Filed Oct. 31, 1990, Ser. No. 619,704

Claims priority, application France, Dec. 28, 1989, 89 17325

Int. Cl.[5] H01L *33/00, 27/12*

U.S. Cl. 359—326 **21 Claims**



1. Device for the conversion of an infrared radiation into another radiation of energy greater than that of this infrared radiation, characterized in that it comprises a multilayer semiconductor structure (4) comprising at least one first semiconductor layer (18) and at least one second semiconductor layer (22), in which layers there are respectively confined an electron gas and a gas of holes, or in which layers it is possible to confine respectively an electron gas and a gas of holes, the structure being such that there is at least one delocalized electron state ($|3>$) in at least the first and the second layers, this delocalized state having an energy greater than that of the electrons of the electron gas, the difference between the energy of the delocalized state ($|3>$|) and that of the ground state ($|1>$) of the electron gas being within the infrared range, so that when the structure is illuminated in a manner not perpendicular to the layers by a first radiation which is within the infrared range and the energy (E1) of which is equal to the difference between the energy of the delocalized state and that of the ground state of the electron gas, this structure emits a second radiation of energy (E2) greater than that of the first, by radiative recombination involving the holes of the gas of holes, and in that the device further comprises means (6) for regenerating, or for creating before use of the device and then regenerating, the electron gas and the gas of holes.

5,160,993

HIGH SPEED OPTOSEMICONDUCTOR DEVICE HAVING MULTIPLE QUANTUM WELLS

Hideaki Ishikawa, Hadano; Yoshihiro Sugiyama, Atsugi; Shunichi Muto, Atsugi, and Toshio Fujii, Atsugi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 6, 1991, Ser. No. 711,548

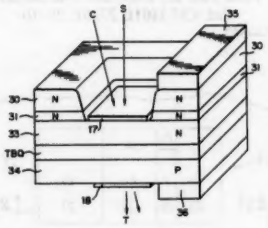
Claims priority, application Japan, Jun. 6, 1990, 2-147897; Jul. 3, 1990, 2-175846; Feb. 20, 1991, 3-26509

Int. Cl.[5] H01L *27/14*

U.S. Cl. 257—14 **24 Claims**

1. An optosemiconductor device comprising:

a superlattice configuration of a first quantum well layer, a second quantum well layer thicker than said first quantum well layer, and a potential barrier layer therebetween, said potential barrier layer having a thickness thereby inviting a tunneling phenomenon, photo-excited carriers generated in a first quantum well layer being tunnelled through said potential barrier layer toward said second quantum well layer so that the tunneled carriers are accumulated in said second quantum well layer; and



means for applying an electric field to said superlattice configuration to expel the tunneled carriers from said second quantum well layer, said electric field applying means being arranged to apply said electric field in a direction which is parallel to a stacked face of said superlattice configuration.

5,160,994

HETEROJUNCTION BIPOLAR TRANSISTOR WITH IMPROVED BASE LAYER

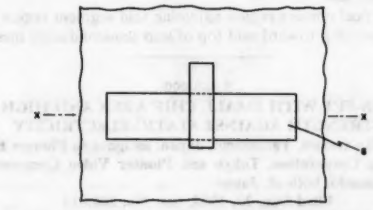
Hidenori Shimawaki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 19, 1991, Ser. No. 657,672

Claims priority, application Japan, Feb. 19, 1990, 2-36099

Int. Cl.[5] H01L *29/72, 29/161*

U.S. Cl. 257—190 **6 Claims**



1. A heterojunction bipolar transistor comprising:

an emitter layer made of a first conductivity type semiconductor compound that does not contain In, said emitter layer being formed on a semi-insulating substrate;

a base layer consisting of a first layer of a second conductivity type compound semiconductor that is formed on said emitter layer and that is free of In and a second layer of a compound semiconductor that is formed on said first layer and that contains In; and

a collector layer of the first conductivity type compound semiconductor that is free of In, said collector layer being formed on said second layer of said base layer.

5,160,995

SEMICONDUCTOR IC DEVICE WITH DUMMY WIRES

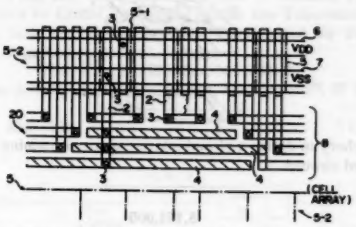
Satoshi Wada, Chigasaki; Shinichi Wakabayashi, Yokohama, and Masayo Fukuda, Ninomiya, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 552,082, Jul. 13, 1990, abandoned. This application Jul. 25, 1991, Ser. No. 737,605

Claims priority, application Japan, Jul. 21, 1989, 1-189312

Int. Cl.[5] H01L 27/02

U.S. Cl. 257—207 7 Claims



1. A semiconductor integrated circuit device comprising:

a semiconductor integrated circuit chip including a semiconductor substrate to which a first power source potential is supplied;

at least two cell arrays each extending in a longitudinal direction, and each having a plurality of cells arranged in parallel on a major surface of said semiconductor substrate;

a plurality of cell-to-cell wires in a region between said at least two cell arrays, said cell-to-cell wires extending in the longitudinal direction;

a plurality of dummy wires in the region between said at least two cell arrays, said dummy wires extending in the longitudinal direction, said dummy wires having the same pitch and width parallel to the major surface and transverse to the longitudinal direction as the cell-to-cell wires, and said dummy wires being connected to an internal power source terminal having a second power source potential which is different from the first power source potential; and

a connection layer connected to the second power source potential and said dummy wires, the connection layer being transverse to the dummy wires;

wherein said dummy wires provide means for stabilizing the second power source potential.

5,160,996

STRUCTURE AND METHOD OF MANUFACTURE FOR SEMICONDUCTOR DEVICE

Shinji Odanaka, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Inc., Japan

Continuation of Ser. No. 368,385, filed as PCT/JP88/01017, Oct. 6, 1988, abandoned. This application Aug. 9, 1991, Ser. No. 744,651

Claims priority, application Japan, Oct. 8, 1987, 62-254203; Apr. 11, 1988, 63-88714

Int. Cl.[5] H01L 27/02, 29/06

U.S. Cl. 257—375 5 Claims

1. A semiconductor device comprising:

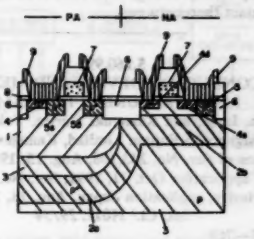
a semiconductor substrate of a first conductivity type;

a well which is of a second conductivity type and which is selectively formed in the semiconductor substrate;

a buried layer which is of the first conductivity type, the buried layer having a first portion of a higher dopant concentration than the semiconductor substrate, and being formed in a deep region of the semiconductor substrate directly below the well and a second portion formed in a region of the semiconductor substrate which is positioned higher than the region in which the first portion is formed; and

an insulating isolation layer formed extending to an upper surface of a side region of the well;

wherein the first and second portions of the buried layer are formed integrally in a region of the semiconductor substrate which is directly below the insulating isolation layer, surround the well within the semiconductor sub-



strate, and have a high concentration of a dopant that is of the first conductivity type at a position which is directly below the insulating isolation layer, and wherein a transistor of the first conductivity type is formed at the well and a transistor of the second conductivity type is formed in the semiconductor substrate above the second portion of the buried layer.

5,160,997

SEMICONDUCTOR INTEGRATED CIRCUIT WITH SHIELD ELECTRODES FOR PROTECTING THE INTERCONNECTION LINES FROM UNDESIRABLE RADIATION

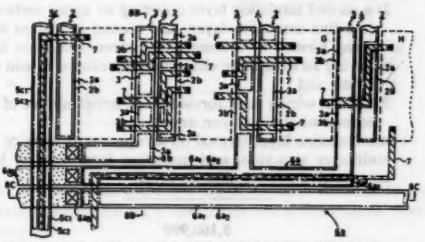
Fumio Sandoh, Tochigi, and Kazuo Tomizaka, Meiwa, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Continuation of Ser. No. 389,179, Aug. 3, 1989, abandoned. This application Apr. 11, 1991, Ser. No. 684,471

Claims priority, application Japan, Aug. 12, 1988, 63-202199; Sep. 20, 1988, 63-235829

Int. Cl.[5] H01L 27/10, 27/15

U.S. Cl. 257—207 4 Claims



1. A semiconductor integrated circuit, comprising:

a semiconductor chip;

a plurality of circuit blocks formed on said semiconductor chip, said circuit blocks each having semiconductor circuit elements;

distribution line means for distributing power to said semiconductor circuit elements and for grounding said circuit blocks, said distribution line means including first and second power supply lines for distributing said power and which are in electrical contact with each other, said distribution line means including first and second ground lines for grounding said circuit blocks and which are in electrical contact with each other; and

inter-block line means for electrically interconnecting said circuit blocks and being electrically insulated from said distribution line means, said inter-block line means includ-

ing inter-block lines, said first power supply lines and said first ground lines being cut at desired locations for enabling said inter-block lines to pass therethrough, continuity of power distribution through said first power supply lines being maintained by said second power supply lines because of said electrical contact therebetween, continuity of grounding through said first ground lines being maintained by said second ground lines because of said electrical contact therebetween.

5,160,998

SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE SAME

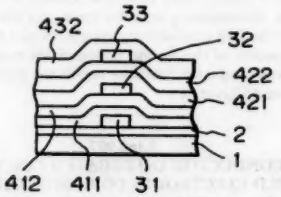
Junichi Itoh, Inagi, and Kazuyuki Kurita, Yokohama, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Continuation of Ser. No. 233,108, Aug. 15, 1988, abandoned. This application Oct. 21, 1991, Ser. No. 780,564

Claims priority, application Japan, Aug. 18, 1987, 62-203483

Int. Cl.[5] H01L *29/34*

U.S. Cl. 257—760 **5 Claims**



1. A semiconductor device comprising:
a) a semiconductor substrate;
b) an insulation film formed on said semiconductor substrate;
c) a metal wiring layer formed on said insulation film;
d) a multilayer structure formed by a plurality of layers, each layer formed in order by
1) a first insulation layer of each layer covering upper and side surfaces of a metal wiring layer that lies thereunder, said first insulation layer being formed by a tensile stress insulation layer having a contracting characteristic relative to said substrate,
2) a second insulation layer covering an upper surface of said first insulation layer, said second insulation layer being formed by a compressive stress insulation layer having an expanding characteristic relative to said substrate, and
3) a metal wiring layer formed on an upper surface of said second insulation layer; and
e) an insulation layer formed on an uppermost layer of said multilayer structure, said insulation layer formed by a compressive stress insulation layer.

5,160,999

ACCELERATION RESISTANT PACKAGING FOR INTEGRATED CIRCUITS AND METHOD OF PRODUCING THEM

Hans-Peter Opitz, Ratingen, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

PCT No. PCT/EP89/00806, § 371 Date Jul. 9, 1990, § 102(e) Date Jul. 9, 1990, PCT Pub. No. WO90/05379, PCT Pub. Date May 17, 1990

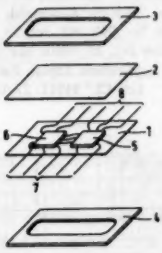
PCT Filed Jul. 12, 1989, Ser. No. 543,823

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1988, 3838085

Int. Cl.[5] H01L *29/06, 23/20*

U.S. Cl. 257—702 **19 Claims**

1. An acceleration resistant packaging for integrated circuits wherein; the integrated circuits are each disposed between two thin sheets of a shock resistant, elastic material; connecting leads for the integrated circuits extend beyond the periphery of the thin sheets; and the two thin sheets are fastened to each other and are clamped in a clamping frame along their entire



periphery to define a closed interior space containing the integrated circuits.

5,161,000

HIGH-FREQUENCY THICK-FILM SEMICONDUCTOR CIRCUIT

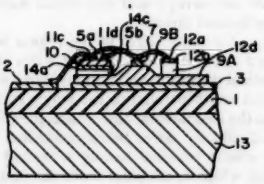
Masanori Koga, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 476,790, Feb. 8, 1990, abandoned. This application Jan. 22, 1991, Ser. No. 643,099

Claims priority, application Japan, Dec. 5, 1989, 1-314440

Int. Cl.[5] H01L *23/02, 23/12, 29/40, 23/48*

U.S. Cl. 257—712 **3 Claims**



1. A high-frequency thick-film hybrid semiconductor circuit comprising:
an insulating substrate having a first surface;
a conductive input film disposed on the first surface of said insulating substrate;
a conductive output film disposed on the first surface of said insulating substrate;
at least two conductive grounding films disposed on the first surface of said insulating substrate with said conductive output film disposed therebetween;
a first conductive grounding bridge including two legs, each leg being disposed on one of said at least two conductive grounding films, and a bridging portion joining the legs and spaced from the first surface;
a capacitive element mounted on the bridging portion of said first grounding bridge and including a first bonding pad;
a second conductive grounding bridge including two bases, each base being disposed on one of said at least two conductive grounding films, a bridging portion joining the bases and spaced from the first surface, and a second bonding pad on said bridging portion;
a heat-radiating plate mounted on said conductive output film, said heat-radiating plate having a first end portion disposed between said conductive output film and said bridging portion of said first grounding bridge, a second end portion disposed between said conductive output film and said bridging portion of said second grounding bridge and a protrusion protruding away from said substrate and including a top surface disposed between said first and second grounding bridges; and

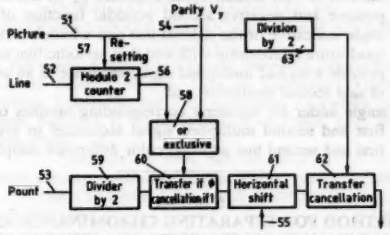
a semiconductor element mounted on said heat-radiating plate on said top surface between said first and second grounding bridges and having a third bonding pad wherein said first, second, and third bonding pads are substantially coplanar.

5,161,001

METHOD FOR SUB-SAMPLING IN THE AXIS OF MOTION OF A SEQUENCE OF ELECTRONIC PICTURES

Daniele Pele, and Bruno Choquet, both of Rennes, France, assignors to Centre National d'Etudes des Telecommunications, Issy les Moulineaux and Telediffusion de France, Montrouge Cedex, both of, France

Filed Dec. 9, 1988, Ser. No. 282,451
Claims priority, application France, Dec. 16, 1987, 87 17602
Int. Cl.[5] H04N *7/12*
U.S. Cl. 358—138 **7 Claims**



1. In a method for sub-sampling a signal representative of a sequence of electronic non-interlaced pictures, including a preceding picture and a current picture, in order to obtain a compression of said signal, each picture of the sequence including at least one picture zone and comprising picture points arranged in sets of even-parity lines and odd-parity lines, said method including for each current picture to be sub-sampled the step of:

selectively eliminating in each of said picture zones one of the sets of lines of picture points, the selection of the set of lines to be eliminated comprising the steps of:

associating with each point of a preceding sub-sampled picture a speed vector,

projecting each point of said preceding sub-sampled picture according to the speed vector associated therewith, and

selecting one of the sets of lines of picture points of the current picture so as to eliminate picture points approximately corresponding spatially to the projection of points of said preceding sub-sampled picture.

5,161,002

CONVERGENCE CONTROL SYSTEM FOR MULTIPLE VERTICAL FORMATS

Enrique Rodriguez-Cavazos, Indianapolis, Ind.; Günter Gleim, Villingen, and Jacques Chauvin, Monchweiler, both of Fed. Rep. of Germany, assignors to Thomson Consumer Electronics, Inc., Indianapolis, Ind.

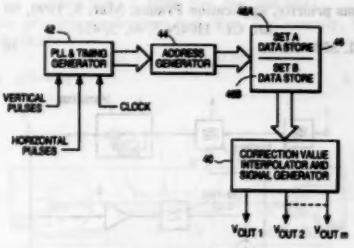
Continuation of Ser. No. 397,545, Aug. 23, 1989, abandoned. This application Dec. 13, 1991, Ser. No. 807,420
Int. Cl.[5] H04N *7/01, 7/04, 11/20, 11/06*
U.S. Cl. 358—140 **21 Claims**

1. A convergence control system for multiple vertical formats, comprising:

means for selecting one of a number of vertical formats for displaying a video signal, different vertical formats having different vertical heights;

a data store for different sets of convergence correction values, for generating selectable sets of convergence correction signals, said sets of convergence correction values defining different sets of grid lines substantially parallel with horizontal scan lines, adjacent ones of said grid lines being spaced from one another at different intervals for said different vertical formats; and,

means for generating said convergence correction signals for said video signal from each of said sets of convergence



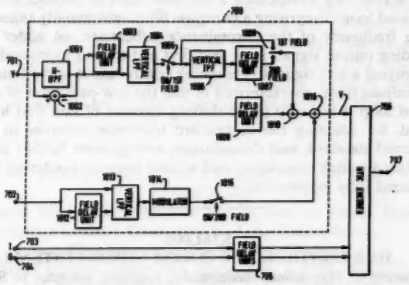
correction values, said generating means being responsive to said selecting means for producing convergence correction signals uniquely appropriate for said selected vertical format.

5,161,003

COMPATIBLE TELEVISION SYSTEM WITH COMPANDING AUXILIARY SIGNAL

Seijiro Yasuki; Kiyoyuki Kawai, and Noboru Taga, all of Kanagawa, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 11, 1991, Ser. No. 667,297
Claims priority, application Japan, Mar. 13, 1990, 2-63331
Int. Cl.[5] H04N *7/00, 11/00*
U.S. Cl. 358—141 **8 Claims**



1. A compatible television signal encoder for encoding a television signal having a first signal and second signal, comprising:

dividing means for dividing the television signal into an auxiliary signal and a main signal having a first scanning field signal associated with said main signal, and a second scanning field signal associated with said main signal, said main signal including:

the first signal and

low-frequency components of the second signal multiplexed with the first signal,

interpolating means for producing an interpolating scanning field signal using the first scanning field signal of the main signal output from the dividing means;

replacing means for replacing the second scanning field signal of the main signal with the interpolating scanning field signal output from the interpolating means; and

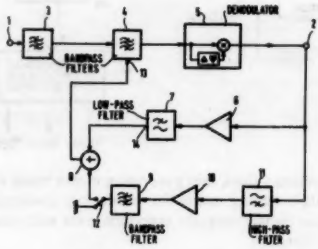
adding means for adding the auxiliary signal from the dividing means to the signal output from the replacing means.

5,161,004

TELEVISION RECEIVER INCLUDING A FREQUENCY DEMODULATOR FOR LOWERING THE THRESHOLD

Jean Egger, Paris, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 8, 1991, Ser. No. 667,612
Claims priority, application France, Mar. 9, 1990, 90 03024
Int. Cl.[5] H04N *5/46, 5/455*
U.S. Cl. 358—21 R **20 Claims**



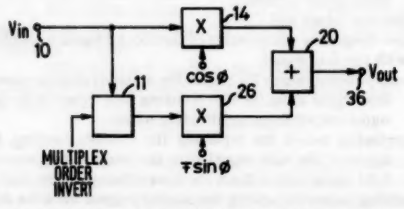
1. A bi-standard television receiver for receiving input signals modulated in frequency in accordance with a first standard, in which a chrominance subcarrier is multiplexed in frequency, or in accordance with a second standard, in which the signals are temporally multiplexed, said bi-standard television receiver being provided with a demodulator arrangement comprising an input for receiving the input signals, a frequency demodulator for demodulating said input signals, a tunable bandpass filter, arranged between said input and said frequency demodulator, having a tunable central frequency which is controlled at the frequency of the input signals by feedback means returning a demodulated output signal from the frequency demodulator to a tuning control input of the bandpass filter, said feedback means being realized in the first standard by a first loop comprising a low-pass filter in parallel with a second loop comprising a bandpass filter substantially tuned to the frequency of the chrominance subcarrier, an adder for adding output signals from said first and second loops and for applying a sum signal to the tuning control input of the tunable bandpass filter, characterized in that the low-pass filter of said first loop is the only phase-shifting element of said first loop, and, for adapting the bi-standard television receiver to the second standard, said demodulator arrangement further comprises a switch coupled to said second loop for rendering said second loop inoperative.

5,161,005

HUE CONTROL FOR COLOR VIDEO SYSTEMS

Vincent C. Harradine, Basingstoke, England, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 20, 1990, Ser. No. 482,048
Claims priority, application United Kingdom, Apr. 20, 1989, 8908942
Int. Cl.[5] H04N *9/64*
U.S. Cl. 358—28 **7 Claims**



1. Apparatus for adjusting the hue of a video signal having first and second color difference samples, said apparatus comprising:

input means for alternately providing said first and second color difference samples of the video signal in a first order so as to constitute a first signal sequence;

processing means for processing said first and second color difference samples in said first order to provide a second signal sequence of the color difference samples in which said first and second color difference samples are alternated in a second order, the order of said first and second color difference samples in said second order being reversed relative to said first order thereof in said first signal sequence;

a first multiplier for multiplying said color difference samples of said first signal sequence by a first periodic function of an angle indicative of a desired hue to provide a first multiplied signal sequence;

a second multiplier for multiplying said color difference samples of said second signal sequence by an alternately positive and negative second periodic function of said angle indicative of the desired hue and which is in phase quadrature relationship with said first periodic function to provide a second multiplied signal sequence as an output of said second multiplier; and

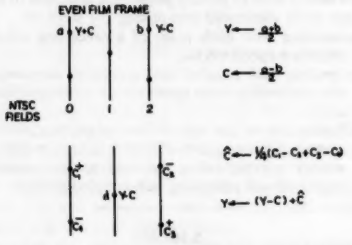
a single adder for summing corresponding samples of the first and second multiplied signal sequences to provide first and second hue adjusted color difference samples.

5,161,006

METHOD FOR SEPARATING CHROMINANCE AND LUMINANCE COMPONENTS OF A TELEVISION SIGNAL

Peter A. Monta, Cambridge; Jae S. Lim, Winchester, both of Mass., and Kenneth A. Parulski, Rochester, N.Y., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jul. 26, 1990, Ser. No. 558,607
Int. Cl.[5] H04N *9/78*
U.S. Cl. 358—31 **10 Claims**



1. A method for separating the luminance and chrominance components of a television signal in which material having a frame rate other than that of the standard rate of the television signal has been converted to the standard rate of the television signal by generating successive fields of the television signal from the same frame of the material,

wherein the material is film recorded at 24 frames/second, said television signal conforms to the NTSC standard of 60 fields/second, and the conversion is done by the 3-2 pull-down method, so that for every pair of adjoining film frames, one frame provides image lines for three successive NTSC fields, and the other frame provides image lines for two successive NTSC fields.

said method comprising the steps of:

separating the chrominance component by forming a first arithmetic combination of lines from two or more of said successive fields in such a manner as to cancel or reduce contributions from the other of the components, thereby leaving predominantly the desired component;

separating the luminance component by forming a second arithmetic combination of lines from two or more of said successive fields in such a manner as to cancel or reduce contributions from the chrominance component, thereby leaving predominantly the luminance component;

wherein said step of separating the chrominance component comprises, for the case of three successive NTSC fields being based on one film frame, generating the chrominance for lines of the first and third fields by forming the difference between corresponding lines from the first and third fields.

5,161,007

RECORDING HEAD WITH CARRIER GENERATION AND TRANSPORT LAYERS ADJACENT A PHOTO-MODULATION LAYER FOR RECORDING INFORMATION INCLUDED IN AN ELECTRO-MAGNETIC RADIATION-BEAM APPLIED THERETO

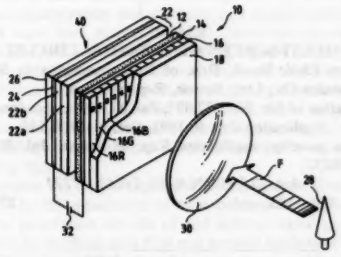
Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Miura; Tsutou Asakura; Masato Furuya, both of Yokohama; Yoshihisa Koyama, Yokosuka, and Yuji Uchiyama, Chigasaki, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Apr. 25, 1991, Ser. No. 691,614

Claims priority, application Japan, Apr. 27, 1990, 2-112942

Int. Cl.[5] H04N *3/10, 1/028;* **G02F** *1/135*

U.S. Cl. 358—43 **9 Claims**



1. A recording apparatus for recording information included in an electro-magnetic radiation-beam applied thereto, comprising:

(a) a first electrode layer which transmits said electro-magnetic-beam incident thereto;

(b) a second electrode layer facing said first electrode layer for applying a given voltage between said first and second electrode layer;

(c) a carrier generation layer provided between said first and second electrode layers responsive to said electro-magnetic beam from said first electrode layer for generating carriers in accordance with an intensity of said electro-magnetic beam per unit area of said carrier generation layer;

(d) a carrier transport layer sandwiched between said carrier generation layer and said second electrode layer for transportiong said carriers toward said second electrode layer in response to an electric field produced by application of said given voltage to said first and second electrode layer; and

(e) a recording layer provided between said first electrode layer and said carrier generation layer for recording said information by retaining charges developed by transportation of said carriers in said carrier transport layer, said recording layer transmitting said electro-magnetic beam from said first electrode layer.

5,161,008

OPTOELECTRONIC IMAGE SENSOR FOR COLOR CAMERAS

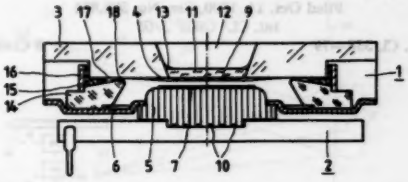
Hans W. Funk, Hirschberg, Fed. Rep. of Germany, assignor to Proxitronic Funk GmbH & Co. KG, Bensheim, Fed. Rep. of Germany

Filed Nov. 2, 1990, Ser. No. 608,514

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1989, 3936930

Int. Cl.[5] H04N *9/07*

U.S. Cl. 358—44 **6 Claims**



1. An optoelectronic image sensor for a color camera comprising:

(a) an image intensifier which is configured as a proximity-focussed image intensifier diode and contains a photocathode;

(b) an interline-type semiconductor sensor coupled to the image intensifier and having light-sensitive elements arranged in lines and columns and light-insensitive areas located between the light-sensitive elements of adjacent columns; and

(c) a color stripe filter which is disposed in front of the photocathode such that one color strip of the color stripe filter is associated with one column of light-sensitive elements of the semiconductor sensor; wherein the color stripe filter is attached to a glass pane which has a smaller diameter than the proximity-focussed image intensifier, and wherein the glass pane is inserted into a support ring preferably also made of glass in such a way that the surfaces of both the glass pane and the support ring, which point into the interior of the proximity-focussed image intensifier, are located essentially on the same plane.

5,161,009

IC MODULE HAVING A FOLDING JUNCTION STRUCTURE

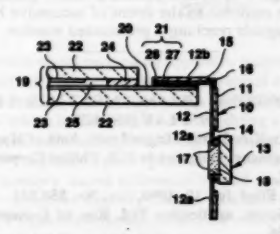
Minoru Tanoi, and Masayasu Kizaki, both of Fussa, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed May 31, 1991, Ser. No. 708,346

Claims priority, application Japan, Jun. 7, 1990, 2-147310

Int. Cl.[5] H01L *23/48, 29/44, 23/28;* **H05K** *1/00*

U.S. Cl. 359—82 **18 Claims**



1. An IC module comprising:

a film substrate with an opening provided therein;

a plurality of wiring leads arranged on the surface of said film substrate with some portions of said wiring leads bridging said opening;

an electrically insulative plastic coating said some portions of said wiring leads bridging said opening; and

an IC chip coupled to said wiring leads;

wherein said film substrate is folded at a part thereof where said opening is located.

5,161,010

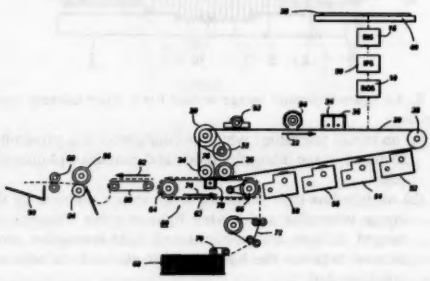
COLOR IMAGE PROCESSING APPARATUS FOR SUBSTITUTING A BLACK PIGMENT FOR IMPROVED BLACK COPYING

David Birnbaum, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 11, 1990, Ser. No. 595,881

Int. Cl.[5] G03F *3/08*

U.S. Cl. 358—79 **8 Claims**



1. An apparatus for processing signals from a raster input scanner, including:

means for delaying the signals being generated by the raster input scanner for a selected time interval;

means for detecting the intensity of the signals generated by the raster input scanner to determine the relationship therebetween, said detecting means generating a first signal in response to the signals from the raster input scanner being in a preselected relationship and a second signal in response to the signals from the raster input scanner being in a relationship other than the preselected relationship, said detecting means generates a binary signal having a high output when the intensity of the signals from the raster input scanner is in the preselected relationship and a low output when the intensity of the signals from the raster input scanner is in the relationship other than the preselected relationship; and

logic means, coupled to said detecting means and said delaying means, for producing a gray signal responsive to the first signal from said detecting means, and a non-gray signal, responsive to the second signal from said detecting means, said logic means includes means for counting the number of binary signals from said detecting means having a high output, said counting means generating a set signal in response to the count of successive high output binary signals reaching a preselected number.

5,161,011

SYNCHRONIZING ARRANGEMENT FOR A PICTURE DISPLAY DEVICE

Gerhard Pietz-Kirsch, and Jürgen Lenth, both of Hamburg, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

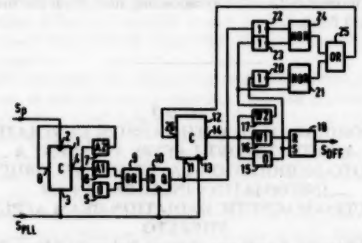
Filed Jul. 19, 1990, Ser. No. 556,931

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1989, 3924686

Int. Cl.[5] H04N *5/04*

U.S. Cl. 358—148 **21 Claims**

1. A synchronizing arrangement for a picture display device comprising: a synchronizing signal separating stage in which horizontal synchronizing pulses are recovered from a television signal which contains a horizontal synchronizing composite signal applied thereto, a horizontal synchronizing circuit to which said horizontal synchronizing pulses are applied for synchronizing purposes, means for detecting a switching criterion which is satisfied when a predetermined number of horizontal synchronizing pulses per picture line is exceeded or when no horizontal synchronizing pulse per picture line occurs, and means coupled to said detecting means for switching the horizontal synchronizing circuit to a fixed rated frequency when the switching criterion is satisfied for a first presettable number of picture lines and for switching the horizontal synchronizing circuit to the synchronized state by means of the horizontal synchronizing pulses when the switching criterion is no longer satisfied for a second presettable number of picture lines.



5,161,012

MULTI-SCREEN GENERATION CIRCUIT

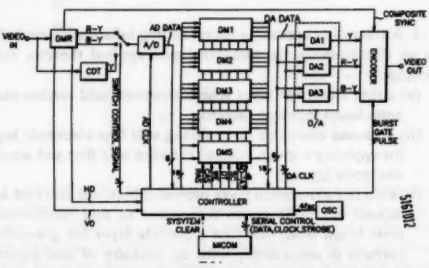
Hoon-Sun Choi, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Continuation of Ser. No. 387,591, Jul. 31, 1989, abandoned. This application Jan. 9, 1991, Ser. No. 638,145

Claims priority, application Rep. of Korea, Jul. 30, 1988, 9677/1988[U]

Int. Cl.[5] H04N *9/74, 5/262, 5/272*

U.S. Cl. 358—183 **17 Claims**



1. A multi-screen generation circuit for a digital color television and a video tape recorder including plural dual-port memories, a synchronizing signal generator, a microcomputer, an analog-to-digital converter and a digital-to-analog converter, said circuit comprising:

command decoder means for receiving vertical synchronizing signals from the synchronizing signal generator to generate display ode selection data by decoding multi-screen mode command data together with control signals generated by said microcomputer;

address signal generator means having row/column writing and row/column reading address signal generation circuits dividing image data, for display in a number of multi-screen modes in each domain of a video screen and pro-

viding writing address signals to said plural dual-port memories;

write reference signal generator means for receiving vertical/horizontal synchronizing signals generated from the synchronizing signal generator and display mode selection data from said command decoder means to provide a write begin signal and a write enable signal;

write display controller means coupled to receive vertical synchronizing signals and display mode selection data, for designating row/column writing address signal generation circuits of said address signal generator means to receive said display mode selection data;

analog-to-digital clock generator means coupled to receive horizontal synchronizing signals generated from said synchronizing signal generator, a basic clock signal and said display mode selection data, for demultiplying said basic clock signal in accordance with said display mode selection data to provide first clock signals to the analog-to-digital converter;

first multiplexer means for multiplexing said writing address signals generated from said address signal generator means to provide address data to said plural dual-port memories;

write timing generator means coupled to receive said first clock signals, for digitalizing video signals according to said display mode selection data, and said write-enable and write-begin signals to generate a second clock signal, address switching signals, a plurality of data transmission signals for controlling transmission of row/column address strobes and write enable signals to the plural dual-port memories;

serial-parallel converter means for receiving serial digitized signals of said video signals having first and second luminance components and chrominance components generated from said analog-to-digital converter to parallelly generate first and second luminance signals and a chrominance signal in accordance with said second clock signal;

read timing generator means for receiving horizontal synchronizing signals and said basic clock signal to generate burst gate pulses and control clock signals for the digital-to analog converter, and serial clock signals and control timing signals;

latch means for outputting multi-screen address data designated by the generation of row/column reading address signal generation circuits of said address signal generator means by latching said first and second luminance signals and said chrominance signal in accordance with said serial clock signals; and

multiplexer means for mixing data of the latched first and second luminance signals and chrominance signal in accordance with said control timing signals to provide mixed data to the digital-to-analog converter.

5,161,013

DATA PROJECTION SYSTEM WITH COMPENSATION FOR NONPLANAR SCREEN

Karen S. Rylander; Karl M. Fant, both of Minneapolis, and Werner H. Egli, Maple Grove, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 8, 1991, Ser. No. 681,914
Int. Cl.[5] H04N *5/74, 7/00*
U.S. Cl. 358—160 **12 Claims**

1. A data projection system, said system comprising,

computer means including a buffer memory and a display memory,

a graphics program runnable by said computer means to generate display data for said display memory,

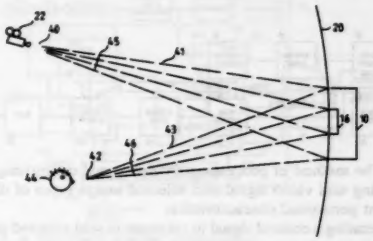
projection and view points laterally spaced from each other,

data projector means having access to said display memory and being operable to output a pixelized image from said display memory in the form of diverging rays diverging from said projection point,

a viewing screen having a curved reflecting surface for receiving said divergent rays and reflecting them in the form of converging rays converging at said view point,

a virtual output screen in a plane between said projection point and said reflection surface having a rectangular array of output pixels formed by said diverging rays and representing said display data,

a virtual view screen in a plane between said view point and said reflecting surface having a rectangular array of view pixels formed by said converging rays and corresponding respectively to said output pixels,



a reference table having size ratios representing comparisons of dimensional size parameters of said pixels of said virtual view screen relative to corresponding ones of said pixels of said virtual output screen, and

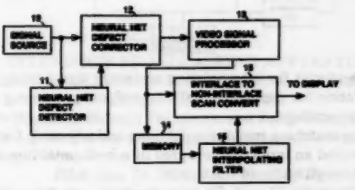
said graphics program being adapted to utilize said size ratios listed in said reference table to condition said display data so as to compensate for inaccuracies of said virtual view screen relative to said virtual output screen due to inaccuracies of said reflecting surface.

5,161,014

NEURAL NETWORKS AS FOR VIDEO SIGNAL PROCESSING

John C. Pearson, Lawrenceville, and Clay D. Spence, Plainsboro, both of N.J., assignors to RCA Thomson Licensing Corporation, Princeton, N.J.

Continuation of Ser. No. 617,908, Nov. 26, 1990. This application Mar. 12, 1992, Ser. No. 850,207
Int. Cl.[5] H04N *5/14*
U.S. Cl. 358—160 **25 Claims**



1. A television signal processing apparatus including at least one neural network for processing a video signal representing an image, said neural network including a plurality of perceptrons each of which includes means for weighting a plurality of delayed representations of said video signal, means for providing sums of weighted signals provided by said weighting means, and memory means addressed by said sums and programmed at respective memory address locations with values representing a sigmoidal function of address values of the form $1/(e^{-Y}+1)$ where Y corresponds to respective sums, said neural network also including means for combining output signals provided by ones of said perceptrons for providing a processed signal, and said apparatus including utilization means responsive to said processed signal.

5,161,015

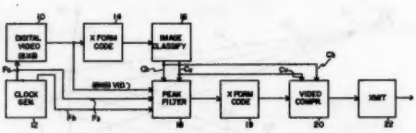
SYSTEM FOR PEAKING A VIDEO SIGNAL WITH A CONTROL SIGNAL REPRESENTATIVE OF THE PERCEPTUAL NATURE OF BLOCKS OF VIDEO PIXELS

Richard W. Citta, Oak Park, and Stephen M. Dicke, Wheeling, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Continuation-in-part of Ser. No. 636,307, Dec. 31, 1990, abandoned. This application Apr. 1, 1991, Ser. No. 678,778

Int. Cl.[5] H04N *5/208*

U.S. Cl. 358—162 **14 Claims**



1. The method of processing a video signal comprising:

coding said video signal into selected image types of different perceptual characteristics;

generating a control signal in response to said selected image types; and

peaking said video signal in accordance with said control signal.

5,161,016

METHOD OF INTERPOLATING AN IMAGE SIGNAL USING A SLOPE CORRELATION AND A CIRCUIT THEREOF

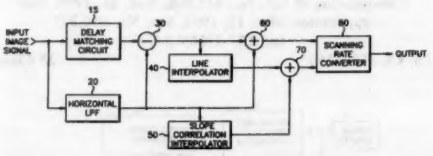
Jeong-Hoon Kim, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Nov. 26, 1991, Ser. No. 798,125

Claims priority, application Rep. of Korea, Dec. 22, 1990, 1990-21499

Int. Cl.[5] H04N *5/208, 7/01*

U.S. Cl. 358—166 **5 Claims**



1. A circuit for interpolating an image signal using a slope correlation for use in a digital image signal processing apparatus, comprising:

delay matching means for delaying and adjusting for a given period an input image signal of a horizontal line supplied through an input terminal;

horizontal low-pass filter means connected to said input terminal, for passing a low frequency component of said input image signal, to thereby generate a slope correlation interpolation area signal under a predetermined cut-off frequency;

subtracter means connected to said delay matching means and said horizontal low-pass filter means, for subtracting said slope correlation interpolation area signal from a delayed signal through said delay matching means, to thereby generate a line interpolation area signal above said predetermined cut-off frequency;

slope correlation interpolator means connected to said horizontal low-pass filter means, for interpolating an image signal having a high correlation degree between picture elements using a slope correlation;

line interpolator means connected to said subtracter means, for line-interpolating an image signal between horizontal lines;

first adder means connected to said subtracter means and said horizontal low-pass filter means, for adding said line interpolation area signal to said slope correlation interpolation area signal;

second adder means connected to said line interpolator means and said slope correlation interpolator means, for adding a line interpolation signal output from said line interpolator means to a slope correlation interpolation signal output from said slope correlation interpolator means; and

scanning rate converter means connected to said first and second adder means, for converting a scanning rate to perform a non-interlace scanning of image signals output from said first and second adder means.

5,161,017

GHOST CANCELLATION CIRCUIT

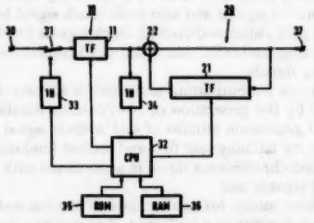
Takashi Sato, Tokyo, Japan, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 28, 1991, Ser. No. 676,927

Claims priority, application Japan, Apr. 4, 1990, 2-90038; Apr. 4, 1990, 2-90039

Int. Cl.[5] H04N *5/21, 9/64, 5/208*

U.S. Cl. 358—166 **7 Claims**



1. A ghost cancellation circuit comprising a non-recursive and a recursive filter coupled to each other in a cascade fashion, said circuit further comprising:

a first memory for storing a received ghost cancellation reference signal contained in an input video signal;

a second memory in which a predetermined ghost cancellation reference signal has been stored;

calculation means for calculating a first group of filter coefficients for the non-recursive filter based on said received ghost cancellation reference signal stored in said first memory and said predetermined ghost cancellation reference signal stored in said second memory, and for setting said first group of filter coefficients to the non-recursive filter;

filtering means for causing said received ghost cancellation reference signal to be passed through the non-recursive filter, to which said first group of filter coefficients have been set, to thereby obtain a filtered ghost cancellation reference signal; and

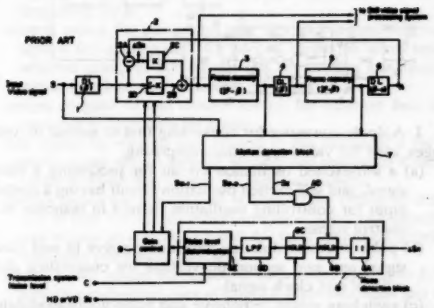
setting means for setting to the recursive filter, as a second group of filter coefficients, values corresponding respectively to time-series data representative of said filter ghost cancellation reference signal.

5,161,018

NOISE REDUCTION SYSTEM FOR COLOR TELEVISION SIGNAL

Osamu Matsunaga, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 29, 1991, Ser. No. 691,829
Claims priority, application Japan, Apr. 28, 1990, 2-114510; Jun. 28, 1990, 2-168505
Int. Cl.[5] H04N 5/213
U.S. Cl. 358—167 5 Claims



1. A noise reducer for processing a received video signal comprising:

detection means for detecting a difference between the received video signal and two-frame delayed signals of said received video signal and producing a two-frame difference signal;

noise reduction means for deducting remaining noise from said two-frame difference signal and from the received signal in response to control signals and producing respective noise reduced signals;

subtraction means for subtracting the noise reduced signal based on said two-frame difference signal from the noise reduced signal based on said received signal and producing a still video image signal having a noise component thereof suppressed;

noise level detection means for detecting a noise level of an original video signal before transmission based on said two-frame difference signal;

motion level detection means for detecting a motion condition of said received video signal; and

control means for producing said control signals controlling the deducted ratio of said two-frame difference signal obtained by said detection means and the received video signal within said noise reduction means, said control signals being generated in accordance with said noise level of the original video signal detected by said noise level detection means and said motion condition detected by said motion level detector means; and

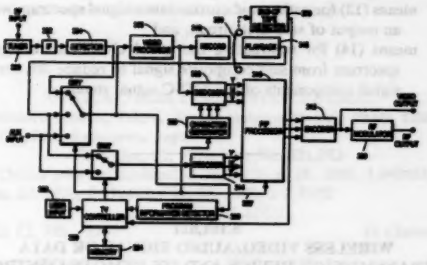
wherein said noise level detection means includes an absolute value circuit receiving said two-frame difference signal and producing an output fed to a hold circuit for holding said output in response to a signal from said motion level detection means representing zero motion, the output of said hold circuit representing a detected average level of the noise component in the original signal and being fed to a nonlinear amplifier for amplifying the detected average level of the noise component in response to a signal representing a noise level of the system transmitting the received video signal and producing said signal generated in accordance with the detected noise level of the original signal fed to said control means.

5,161,019

"CHANNEL GUIDE" AUTOMATICALLY ACTIVATED BY THE ABSENCE OF PROGRAM INFORMATION

Peter M. Emanuel, Clarksburg, N.J., assignor to RCA Thomson Licensing Corporation, Princeton, N.J.

Filed Jun. 29, 1990, Ser. No. 546,470
Int. Cl.[5] H04N 5/50
U.S. Cl. 358—183 12 Claims



1. A television system, comprising:

selection means for selecting a television signal from a plurality of television signals;

main signal processing means for processing a main picture signal provided by said selection means and corresponding to a main picture;

auxiliary signal processing means for storing samples representative of a selected television signal for each of a plurality of secondary television signals, and for producing a combined signal which represents a picture including a plurality of images corresponding to respective ones of said secondary television signals in a plurality of inset-image locations of said picture;

detection means for providing a control signal representative of the detection of the absence of program information in said main picture signal; and

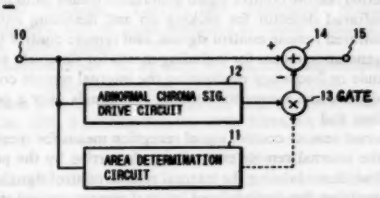
control means, coupled to said detection means, said auxiliary signal processing means, and said selection means, for automatically causing said selection means to select each of said plurality of television signals sequentially, and automatically causing said auxiliary signal processing means to store said samples and produce said combined signal in response to said control signal.

5,161,020

TELEVISION BROADCASTING APPARATUS INCLUDING MONOCHROMATIC CHARACTERS WITH A COLORED CONTOUR

Yoshio Sugimori; Susumu Takayama, and Tadao Kurosaki, all of Tokyo, Japan, assignors to Nippon Television Network Corporation, Tokyo, Japan

Filed Jan. 24, 1991, Ser. No. 645,528
Claims priority, application Japan, Jan. 30, 1990, 2-20335
Int. Cl.[5] H04N 9/68, 5/272
U.S. Cl. 358—183 8 Claims



1. A color television signal transmitting apparatus for trans-

mitting a composite signal provided by a color super device and including an NTSC color signal and a signal corresponding to a title including monochromatic characters on a colored contour, comprising:

a first circuit (11) responsive to said composite signal for determining an area of a television receiver display screen on which an output signal distinct from the NTSC signal standard is to be displayed;

a second circuit (12) for deriving a chrominance signal spectrum out of the NTSC signal standard;

means (13) for gating said chrominance signal spectrum with an output of said first circuit; and

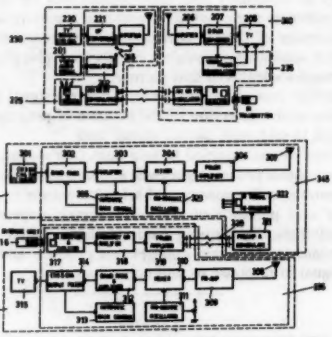
means (14) for subtracting the gated chrominance signal spectrum from said composite signal to reduce dot crawl signal components of the NTSC signal standard.

5,161,021

WIRELESS VIDEO/AUDIO SIGNAL OR DATA TRANSMISSION DEVICE AND ITS REMOTE CONTROL CIRCUIT

Ching-Yun Tsai, 9-5 Fl., No. 230, Sec.2.Hsin I Road, Taipei, Taiwan

Filed Dec. 18, 1990, Ser. No. 629,671
Int. Cl.[5] H04N *5/40, 5/455*
U.S. Cl. 358—188 **18 Claims**



1. A wireless signal or data transmission device and a remote control circuit therefor, comprising:

transmission means including a video signal source and a video transmitter for modulating and transmitting a video signal via an antenna at a frequency of 902–928 MHz;

reception means for receiving the video signal at a frequency of 902–928 MHz, said reception means including a video receiver, means for demodulating the video signal, and means for displaying the video signal on a television set;

internal remote control signal generation means including an infrared detector for picking up and detecting external infrared remote control signals, said remote control signal generation means for including means for slectively amplitude or frequency modulating the internal remote control signals, and means for sending the signals over a power line; and

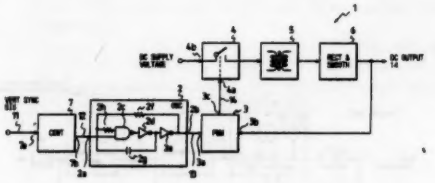
internal remote control signal reception means for receiving the internal remote control signals carried by the power line, demodulating the internal remote control signals, and applying the demodulated internal remote control signals to control said video transmitter.

5,161,022

DC-DC CONVERTER FOR VIDEO APPARATUS

Hiroshi Ichimura, Yokohama; Ikumi Minema, Funabashi, and Wataru Katase, Yokohama, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed May 10, 1991, Ser. No. 698,210
Claims priority, application Japan, May 15, 1990, 2-50811[U]
Int. Cl.[5] H04N *3/18, 5/63*
U.S. Cl. 358—190 **3 Claims**



1. A dc-dc converter for converting first to second dc voltages, used for video apparatus, comprising:

(a) a self-excited oscillation circuit for producing a clock signal, said self-excited oscillation circuit having a control input for controlling oscillation thereof in response to a control signal;

(b) pulse width modulation means responsive to said clock signal and said second dc voltage for controlling duty ratio of said clock signal;

(c) switching means responsive said pulse-width-modulated means for switching said first dc voltage;

(d) rectifying and smoothing means for rectifying and then smoothing an output of said switching means to produce said second dc voltage; and

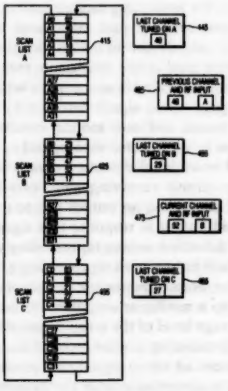
(e) control means responsive to a vertical synchronizing signal of a video signal used in said video apparatus for producing said control signal whose pulse width is shorter than a vertical retrace period of said vertical synchronizing signal.

5,161,023

PREVIOUS CHANNEL FEATURE IN A TELEVISION RECEIVER HAVING MULTIPLE RF INPUTS

Douglas M. Keenan, Noblesville, Ind., assignor to Thomson Consumer Electronics, Inc., Indianapolis, Ind.

Filed Sep. 24, 1990, Ser. No. 589,831
Int. Cl.[5] H04N *5/50*
U.S. Cl. 358—193.1 **11 Claims**



1. A television receiver, comprising:

a plurality of radio frequency (RF) signal input terminals, each of which receives a group of RF signals from respective RF signal sources;

RF switch means having a plurality of inputs, each of which is connected to a respective one of said RF input terminals, said RF switch means having an output at which is developed one of said groups of RF signals selected from said groups of RF signals at said inputs, said RF switch means having a control input for receiving a first control signal for selecting said selected group of RF signals;

tuner means coupled to said RF switch means for receiving said selected group of RF signal, said tuner means selecting a particular RF signal from said selected group of RF signals in response to a second control signal, and converting said particular RF signal to a signal at an intermediate frequency (IF);

control means for generating said first and second control signals for causing said RF switch means to select said selected group of RF signals and for causing said tuner means to select said particular RF signal;

means, coupled to said control means, for entering data in response to operation by a user;

first means for storing data related to the tuning of a currently tuned one of said RF signals, and related to a currently selected one of said RF input terminals;

second means for storing data related to the tuning of that one of said RF signals which was most previously tuned, and related to that one of said RF input terminals which was most previously selected;

wherein said means for entering data comprises keys for selecting individual ones of said RF input terminals and a key (PC) for causing the selection of said most previously tuned RF signal, and operation of said PC key causes the tuning of said most previously selected RF signal and the selection of said most previously selected RF input terminal.

5,161,024

PIXEL ARRAY SCANNING CIRCUITRY FOR A SOLID STATE IMAGING APPARATUS

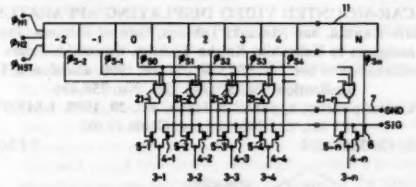
Yasuhiro Oishi, Tatsunomachi, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 10, 1991, Ser. No. 698,219

Claims priority, application Japan, May 16, 1990, 2-124274

Int. Cl.[5] H04N *3/14, 5/335*

U.S. Cl. 358—213.24 **8 Claims**



1. A solid state imaging apparatus comprising:

a pixel array having a plurality of pixels, the pixels being arranged in a matrix and each pixel having a CMD therein;

a plurality of row lines commonly connected to gates of a group of the pixels arranged in an X direction;

a plurality of bit lines commonly connected to sources of a group of the pixels arranged in an Y direction;

a plurality of selecting switches;

a plurality of non-selection switches;

an output line commonly connected to respective bit lines through said selecting switches;

a reference line of a reference potential commonly connected to the bit lines through said non-selection switches;

vertical scanning means for operating said row lines; and

horizontal scanning means for operating said selecting switches and non-selection switches, wherein said horizontal scanning means is operatively connected to control gates of said selecting and non-selection switches such that, prior to a read period during which each of said bit lines is connected to said output line, said horizontal scanning means connects each of said bit lines to said reference line for an amount of time equal to a 1-bit period or a bit period less than a number of horizontal pixels,

said horizontal scanning means including shift registers having a plurality of stages, and being connected to said selecting and non-selection switches such that an output of each of the plurality of stages is operatively connected to a selecting switch corresponding to a current stage and to a non-selection switch of a succeeding stage.

5,161,025

OPTICAL/ELECTRICAL VIEW FINDER

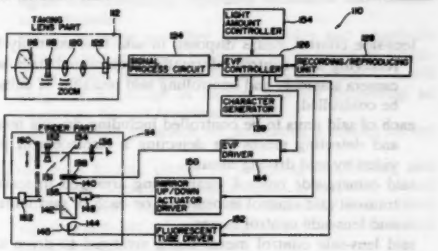
Souichiro Nakao, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 21, 1990, Ser. No. 631,852

Claims priority, application Japan, Dec. 28, 1989, 1-342461; Jun. 28, 1990, 2-170482; Oct. 26, 1990, 2-290552

Int. Cl.[5] H04N *5/225*

U.S. Cl. 358—224 **11 Claims**



5. A view finder apparatus comprising:

an eyepiece;

a half mirror;

optical view finder means for guiding a light coming from an object to be photographed to said eyepiece through said half mirror; and,

electrical view finder means, for displaying at least one of a video signal obtained by photoelectrically converting said light from said object and various photographic information on a display means, and for guiding a display image of said display means to said eyepiece through said half mirror, wherein said display means of said electrical view finder means includes:

transmissive display means; and

external light entrance allowing means for allowing entrance of an external light diffused from the back surface of said transmissive display means.

5,161,026

INTERCHANGEABLE LENS CAMERA SYSTEM HAVING IMPROVED CONTROL INFORMATION COMMUNICATION FACILITY

Toshiaki Mabuchi, Tokyo, and Yoshikazu Nishikawa, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 587,001, Sep. 24, 1990, abandoned. This application Jun. 6, 1991, Ser. No. 711,124

Claims priority, application Japan, Sep. 27, 1989, 1-253392; Feb. 26, 1990, 2-046283; Feb. 26, 1990, 2-046284; Jul. 10, 1990, 2-183171

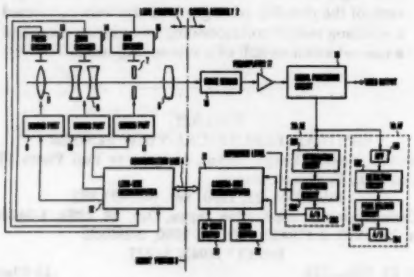
Int. Cl.[5] H04N *5/30*

U.S. Cl. 358—225 **59 Claims**

1. A camera system capable of controlling a plurality of units to be controlled in a lens assembly on the basis of control

information transmitted from a camera assembly, wherein said lens assembly and said camera assembly can be attached to and detached from each other, comprising:

camera-side control means disposed in said camera assembly for transmitting said control information to said lens assembly;



lens-side control means disposed in said lens assembly for receiving said control information transmitted from said camera assembly and controlling said plurality of units to be controlled;

each of said units to be controlled including driving means and detecting means for detecting a displacement provided by said driving means;

said camera-side control means being arranged to serially transmit said control information on each of said units to said lens-side control means;

said lens-side control means being arranged to drive said driving means in each of said units to be controlled on the basis of said control information and to serially transmit to said camera-side control means information on each of said units, which is outputted from said detecting means, and

communication means for performing an initial communication for transmitting information on the construction of said lens assembly to said camera assembly and a control communication for substantially driving each of said units to be controlled in said lens assembly between said camera-side control means and said lens-side control means, information on each of said units to be controlled in said lens assembly, such as the kind and number of units, being transmitted to said camera-side control means by said initial communication.

5,161,027

LARGE AREA PROJECTION LIQUID-CRYSTAL VIDEO DISPLAY SYSTEM WITH INHERENT GRID PATTERN OPTICALLY REMOVED

Hua-Kuang Liu, South Pasadena, Calif., assignor to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

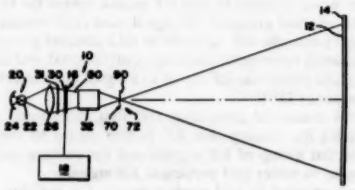
Continuation of Ser. No. 913,433, Sep. 30, 1986, abandoned. This application Dec. 21, 1990, Ser. No. 632,408

Int. Cl.[5] H04N *5/74, 9/31*

U.S. Cl. 358—231 **4 Claims**

1. A system for projecting video images on a screen, comprising:

a liquid crystal array containing a multiplicity of pixels arranged in a multiplicity of rows and columns, and including a multiplicity of largely opaque row and column conductors extending along said rows and columns and forming a grid, each pixel being energizable to control its transparency, said array having rearward and forward sides;



means for generating video signals representing said video images, said generating means connected to said array to energize said pixels in patterns of opacities and transparencies representing said video images;

a light source which directs light against said rearward side of said array to pass in a forward direction to said screen through transparent pixels thereof;

a projecting lens lying forward of said array, said lens constructed to focus said video images of said patterns of opacities and transparencies onto said screen, and to focus an image of light passing through said array at an intermediate plane between said lens and said screen; and

a spatial filter lying at said intermediate plane, said spatial filter forming a pattern of light and dark areas representing largely a Fourier transform of said grid in said liquid crystal array.

5,161,028

CAR-MOUNTED VIDEO DISPLAYING APPARATUS

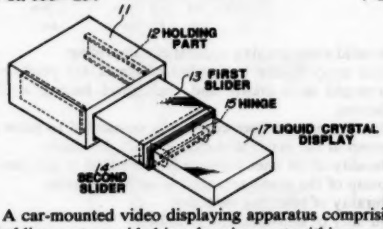
Norio Kawata, and Masaaki Takuma, both of Saitama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 553,968, Jul. 18, 1990, abandoned. This application Sep. 5, 1991, Ser. No. 758,496

Claims priority, application Japan, Jul. 20, 1989, 1-84527[U]

Int. Cl.[5] H04N *5/64;* **G60R** *11/02*

U.S. Cl. 358—254 **7 Claims**



1. A car-mounted video displaying apparatus comprising:

a holding part provided in a housing part within a car;

a first slider slidably provided in said holding part;

a second slider further slidable along said first slider;

a liquid crystal display provided rotatably through a hinge provided at the tip of said second slider;

engaging means for engaging said liquid crystal display, second slider and first slider within said holding part when said liquid crystal display is to be housed within said holding part by pushing said liquid crystal display into

said holding part and disengaging them by further pushing said liquid crystal display into said holding part when said liquid crystal display is to be used; and

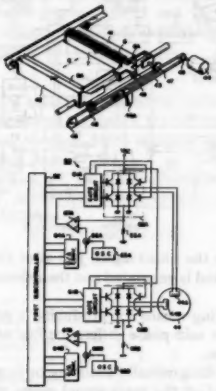
energizing means for energizing said second slider and liquid crystal display in a direction outward from a dashboard while engaged by said engaging means and moving them outward from the dashboard when said engaging means is disengaged.

5,161,029

IMAGE FORMING APPARATUS FOR CONTROLLING STEPPING MOTOR IN ACCORDANCE WITH COPY MAGNIFICATION

Eiichi Yamanishi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 18, 1989, Ser. No. 452,061
Claims priority, application Japan, Dec. 23, 1988, 63-324941
Int. Cl.[5] H04N *1/10, 1/17, 1/23, 1/393*
U.S. Cl. 358—296 8 Claims



1. An image forming apparatus for forming an image of an original on a transfer material, said apparatus comprising:

means for scanning the image of the original;

stepping motor means for moving the scanning means along the original;

means for forming the image scanned by the scanning means on the transfer material;

first setting means for setting a magnification of the image to be formed by the forming means; and

second setting means for setting a moving speed of the stepping motor means to a first speed, and supplying a first current to the stepping motor means when the magnification set by said first setting means falls within a predetermined range, and setting the moving speed of the stepping motor means to a second speed which is lower than the first speed, and supplying a second current which is lower than the first current to said stepping motor means when the magnification exceeds the predetermined range;

wherein the second setting means further comprises:

means for outputting a phase switching signal for setting the speed of the stepping motor means and a current switching signal for setting a driving force of the stepping motor means;

first control means, for controlling the speed of the stepping motor means in accordance with the phase switching signal output from the output means;

means for detecting a current output from the first control means; and

second control means for controlling the driving force of the stepping motor means in accordance with the current detected by the detecting means and the current switching signal supplied from the output means.

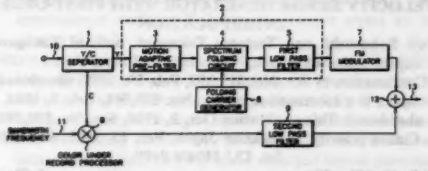
5,161,030

METHOD AND CIRCUIT FOR ENHANCING IMAGE QUALITY OF A VIDEO TAPE RECORDER (VTR) USING MOTION ADAPTIVE SPECTRUM FOLDING METHOD

Tong-Ill Song, Suwon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd, Suweon, Rep. of Korea

Filed Dec. 21, 1990, Ser. No. 632,083
Claims priority, application Rep. of Korea, Dec. 22, 1989, 1989-19316
Int. Cl.[5] H04N *9/79*
U.S. Cl. 358—310 20 Claims

1. A picture quality improvement circuit for a video tape recorder, said circuit comprising:



a luminance/chrominance separator for receiving a video signal and outputting separated luminance and chrominance signals;

a motion adaptive pre-filter for receiving and adaptively filtering said separated luminance signal based on whether an image represented by said video signal is a still image or an image in motion and for outputting an adaptively filtered luminance signal;

a folding carrier generator for generating a folding carrier signal;

a spectrum folding circuit for sampling and folding said adaptively filtered luminance signal in response to said folding carrier signal and for outputting a combined signal comprised of said adaptively filtered luminance signal and a folded signal;

a first low pass filter for receiving and removing high frequency components of said combined signal and for outputting a low frequency component of said combined signal;

frequency modulating means for modulating said low frequency component to generate a modulated signal; and

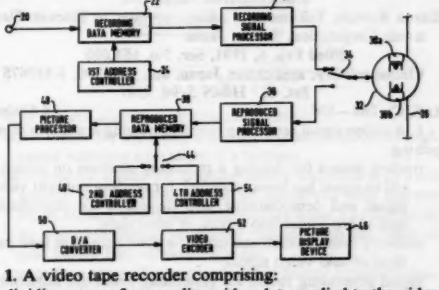
means for combining said separated chrominance signal and said modulated signal to be recorded on a tape.

5,161,031

APPARATUS FOR PROCESSING DATA FOR A VIDEO TAPE RECORDER

Junko Kimura, and Shigeo Tanaka, both of Kanagawa, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 21, 1990, Ser. No. 496,929
Claims priority, application Japan, Mar. 22, 1989, 1-070127
Int. Cl.[5] H04N *9/79*
U.S. Cl. 358—310 15 Claims



1. A video tape recorder comprising:

dividing means for sampling video data applied to the video tape recorder and dividing the video data into N sub-picture data elements, where N is an integer equal to or larger than 2;

means for recording the N sub-picture data elements on a recording medium;

data reproducing means for reproducing first through M-th of the recorded N sub-picture data elements, where M is an integer such that $1 \leq M < N$;

means for distributing the first through M-th sub-picture elements reproduced by the reproducing means into predetermined groups; and

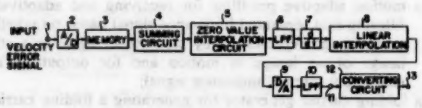
means for displaying the data elements distributed by the distributing means.

5,161,032

VELOCITY ERROR GENERATOR WITH FIRST-ORDER INTERPOLATION

Yuji Kobayashi, and Tsutomu Takamori, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 317,093, Feb. 27, 1989, abandoned, which is a continuation of Ser. No. 825,591, Feb. 3, 1986, abandoned. This application Oct. 2, 1990, Ser. No. 593,393
Claims priority, application Japan, Feb. 13, 1985, 60-24421
Int. Cl.[5] H04N *9/89*
U.S. Cl. 358—326 **6 Claims**



1. Apparatus for generating an improved velocity error signal from a velocity error signal represented by an instantaneous phase difference between burst signals in successive line intervals of a reproduced video signal for use in a time base corrector to remove a time base fluctuation in a color video signal reproduced from a record medium, said apparatus comprising:

first converting means for converting said phase difference to a summed phase shift amount and generating an output signal proportional thereto;

interpolating means including a low-pass filter for inserting a plurality of sampling positions between selected values of said output signal of said first converting means, calculating a phase shift amount for each of said plurality of sampling positions and generating a phase shift amount signal; and

second converting means for converting said phase shift amount signal to a phase difference signal fed to the time base corrector.

5,161,033

APPARATUS FOR PLAYING VIDEO SIGNAL RECORDING MEDIUM

Kazuo Kuroda, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 6, 1991, Ser. No. 651,605
Claims priority, application Japan, Jul. 16, 1990, 2-187675
Int. Cl.[5] H04N *5/94, 9/87*
U.S. Cl. 358—336 **4 Claims**

1. A video signal recording medium playing apparatus comprising:

reading means for driving a recording medium on which a video signal has been recorded, for reading out said video signal and demodulating, and thereafter for digitalizing said video signal into a train of pixel data;

memory means which can store the pixel data of at least one field of said video signal;

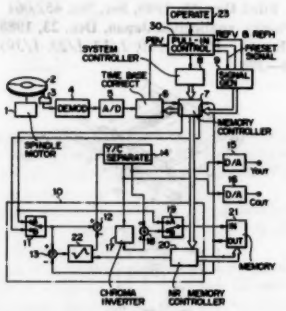
signal generating means for generating reference horizontal and vertical sync signals in accordance with a reset signal;

first control means for sequentially writing a present value of said pixel data into said memory means and correcting said present value by the corresponding pixel data preceding to said present value by one field period in a normal reproducing mode, and for reading out the pixel data of at least one field from said memory means on the basis of said reference horizontal and vertical sync signals in a special reproducing mode;

second control means for controlling a mode switching of the first control means in accordance with a mode designation command; and

output means for converting the digital video signal which is obtained from said first control means into the analog video signal, wherein said second control means comprises:

first detecting means for detecting a phase difference between a reproduction vertical sync signal which is obtained from the video signal just after the mode designation command is generated and the reference vertical sync signal;



second detecting means for producing a phase coincidence signal when said phase difference lies within a predetermined range;

pull-in means for gradually reducing or increasing a generation interval of the reset signal when the phase coincidence signal is absent, for thereafter gradually increasing or reducing the generation interval, for producing the reset signal, and for executing a vertical pull-in control; and

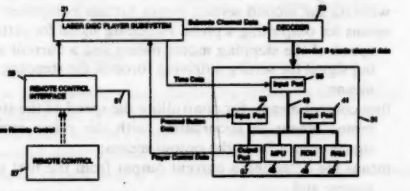
switching instructing means for instructing the mode switching to the first control means in response to said phase coincidence signal during said vertical pull-in control.

5,161,034

BRANCHING TABLE FOR INTERACTIVE VIDEO DISPLAY

Walter R. Klappert, Topanga, Calif., assignor to WNM Ventures Inc., Burbank, Calif.

Filed Jul. 18, 1989, Ser. No. 381,574
Int. Cl.[5] H04N *5/85*
U.S. Cl. 358—342 **17 Claims**



1. An apparatus for providing interactive control of a video laser disc player, said video laser disc player including a laser disc having at least one chapter for reading by a playback head, said chapter having a portion for storing video information and

a portion for storing audio information, said audio information portion having a main channel audio portion and a subcode channel portion, said subcode channel portion having branch table information stored therein, said apparatus comprising:

a) means for reading said branch table information, said reading means including:

i) a subcode channel decoder coupled to said player adapted to receive information stored in said subcode channel as it is read by said playback head and decode said information into subcode packs;

ii) means for converting the subcode packs into rows and columns of branch table information;

b) storage means for storing said read branch table information;

c) means for determining the time position of said playback head relative to said laser disc;

d) means for determining which one of a plurality of control buttons has been depressed by an operator of the player;

e) means for generating control signals which direct the playback head of said player to a position on said laser disc as a function of the branch table information, the relative position of said playback head and the control button determined to have been depressed by said operator.

5,161,035

DIGITAL IMAGE PROCESSING DEVICE FOR ENLARGING ORIGINAL IMAGE WITH HIGH FIDELITY

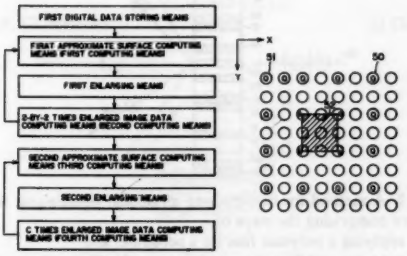
Kiyoji Muramatsu, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 31, 1990, Ser. No. 607,170

Claims priority, application Japan, Oct. 31, 1989, 1-283443; Dec. 27, 1989, 1-342556

Int. Cl.[5] H04N *1/393*

U.S. Cl. 358—451 8 Claims


FIRST DIGITAL DATA STORING MEANS
FIRST APPROXIMATE SURFACE COMPUTING MEANS (FIRST COMPUTING MEANS)
FIRST ENLARGING MEANS
2-BY-2 TIMES ENLARGED IMAGE DATA COMPUTING MEANS (SECOND COMPUTING MEANS)
SECOND APPROXIMATE SURFACE COMPUTING MEANS (THIRD COMPUTING MEANS)
SECOND ENLARGING MEANS
C TIMES ENLARGED IMAGE DATA COMPUTING MEANS (FOURTH COMPUTING MEANS)
X
Y
51
50

1. An image processing device for producing second digital data based upon first digital data, wherein the first digital data represents an original image composed of a first multiplicity of pixels arranged in row and column, each pixel having a density value, and the second digital data represents a C-by-C times enlarged image relative to a size of the original image, the C-by-C times enlarged image being composed of a second multiplicity of pixels arranged in row and column, each pixel having a density value, said device comprising:

storing means for storing the first digital data;

first computing means for computing a first approximate surface approximate to a surface covering all density values of first control points, a group of A-by-A adjacent pixels arranged in row and column being selected as the first control points from the first multiplicity of pixels, the first approximate surface having a center portion. A being an interger equal to or greater than 2;

first enlarging means for producing a 2-by-2 times enlarged center portion while sampling the center portion of the first approximate surface to obtain 2-by-2 sampled values;

second computing means for computing third digital data representative of a 2-by-2 times enlarged image by non-overlappingly combining the 2-by-2 times enlarged center portions produced by said first computing means and said first enlarging means while selecting different groups of A-by-A adjacent pixels arranged in row and column, said different groups of A-by-A adjacent pixels being displaced on pixel-to-pixel basis from said group of A-by-A adjacent pixels in directions of row and column, the 2-by-2 times enlarged image being composed of a third multiplicity of pixels arranged in row and column;

third computing means for computing a second approximate surface approximate to a surface covering all density values of second control points, a group of B-by-B pixels arranged alternately in row and column being selected as the second control points from the third multiplicity of pixels, the second approximate surface having a center portion corresponding to the center portion of the first approximate surface, B being an integer equal to or greater than 2;

second enlarging means for producing a C-by-C times enlarged center portion while sampling the center portion of the second approximate surface to obtain C-by-C sampled values, C being an integer equal to or greater than 2; and

fourth computing means for computing the second digital data, wherein four C-by-C times enlarged center portions are produced by said third computing means and said second enlarging means with respect to each of the first multiplicity of pixels while selecting different groups of B-by-B pixels arranged alternately in row and column, said different groups of B-by-B alternately arranged pixels being displaced from said group of B-by-B alternately arranged pixels by one pixel in directions of row, column, and row and column, and an average value of four C-by-C times enlarged center portions is used as a basis for the second digital data.

5,161,036

PICTURE DIGITIZING SYSTEM USING RANDOMLY VARIED BINARY THRESHOLD DATA

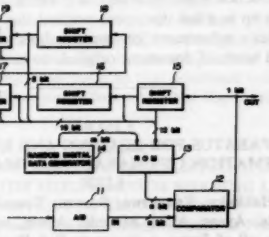
Toshihiko Mannichi, Fuchu, and Toshifumi Yamamoto, Shiroyama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 14, 1990, Ser. No. 626,707

Claims priority, application Japan, Dec. 15, 1989, 1-325548; Dec. 15, 1989, 1-325549; Jul. 18, 1990, 2-189752; Oct. 24, 1990, 2-286272

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—466 20 Claims



1. A picture digitizing system comprising:

input means for inputting a picture signal obtained through raster scanning operation of a picture;

data creation means for creating binary threshold data for a current input picture signal by subjecting said current input picture signal and a previously-input picture signal to a predetermined weighting operation on the basis of past binary data already digitized;

comparison means for comparing said binary threshold data with said current input picture signal to create binary data for the current input picture signal;

feed-back means for outputting said binary data created in said comparison means and also for temporarily storing

therein and feeding the binary data back as past binary data; and

random changing means for randomly changing the binary threshold data created in said data creation means within a predetermined range.

5,161,037

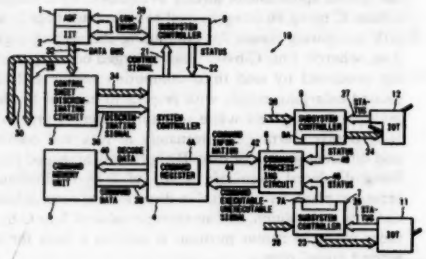
IMAGE PROCESSING SYSTEM AND METHOD FOR PROCESSING DOCUMENTS IN ACCORDANCE WITH A JOB CONTROL SHEET

Hiroshi Saito, Kanagawa, Japan, assignor to Fuji Xerox Corporation, Ltd., Tokyo, Japan

Filed Oct. 10, 1990, Ser. No. 595,223

Int. Cl.[5] G03G *15/00*; H04N *1/04*

U.S. Cl. 358—468 **6 Claims**



1. An image processing system wherein input image information that is read from a document original is subjected to image processing according to machine operating instruction information defined by a job control sheet, to generate output image information, said system comprising:

means for reading and interpreting machine operating instruction information borne by said job control sheet;

means for judging whether or not the interpreted machine operating instruction information is executable; means for executing, when said machine operating instruction is executable, image processing of a batch of document originals following said job control sheet to generate output image information; and

means for feeding forward, when said machine operating instruction is unexecutable, said batch of document originals up to a last document original that immediately precedes a subsequent job control sheet without subjecting said batch of document originals to image processing.

5,161,038

APPARATUS FOR READING AND RECORDING INFORMATION OF CHARACTERS, IMAGES, OR THE LIKE.

Kunio Hakkaku, Kanagawa; Susumu Tomoda, Ayase; Satosi Morita, Ayase; Akira Masuda, Ayase, and Sinji Odagiri, Ayase, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 5, 1991, Ser. No. 755,478

Claims priority, application Japan, Sep. 19, 1990, 2-249859; Oct. 1, 1990, 2-263486; Oct. 13, 1990, 2-274660; Oct. 17, 1990, 2-278619

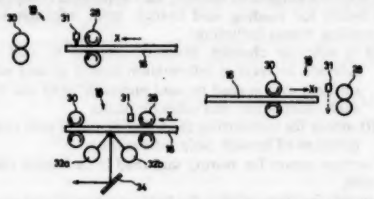
Int. Cl.[5] H04N *1/21*

U.S. Cl. 358—496 **15 Claims**

1. An apparatus for reading and recording information, comprising:

a reading unit for photoelectrically reading information from a document while the document is being horizontally fed in a first direction;

a recording unit for recording the information read by said reading unit on a recording medium while the recording medium is being fed in a second direction; and



said reading unit and said recording unit being disposed in upper and lower positions, respectively.

5,161,039

BIREFRINGENT STRUCTURES FORMED BY PHOTO-EXPOSURE OF POLYMER FILMS AND METHOD FOR FABRICATION THEREOF

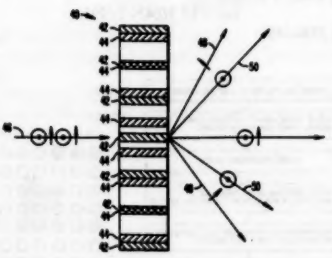
Franklin M. Schellenberg, Cupertino, Calif., assignor to Board of Trustees, Leland Stanford Jr. University, Stanford, Calif.

Continuation of Ser. No. 379,527, Jul. 12, 1991, Pat. No. 5,105,298. This application Aug. 2, 1991, Ser. No. 739,941

The portion of the term of this patent subsequent to Apr. 14, 2009, has been disclaimed.

Int. Cl.[5] G02B *5/18*, *1/08*, *5/30*

U.S. Cl. 359—3 **22 Claims**



1. A method for constructing an optical birefringent structure comprising the steps of:

applying a polymer film on a substrate; and

exposing said film to optical energy of sufficient intensity to excite nonlinear absorption in said polymer film such that a pattern of said exposing optical energy is recorded as a nonlinear optical absorption effect in said polymer film, said optical energy being of a distinct polarization state, and said nonlinear optical absorption effect evidencing said polarization state.

5,161,040

OPTICAL SYSTEM WITH ABERRATION SUPPRESSION AND OPTICAL HEAD UTILIZING THE SAME

Osamu Yokoyama, and Shoichi Uchiyama, both of Suwa, Japan, assignors to Seiko Epson Corporation, Japan

Filed Jan. 29, 1990, Ser. No. 471,955

Claims priority, application Japan, Jan. 30, 1989, 1-20135; Aug. 28, 1989, 1-221227; Sep. 18, 1989, 1-241165; Sep. 18, 1989, 1-241170; Dec. 1, 1989, 1-313190

Int. Cl.[5] G02B *5/32*, *5/18*; G11B *7/12*

U.S. Cl. 359—19 **38 Claims**

1. An optical system having an optical axis for focusing a light beam to an image point on said optical axis and comprising:

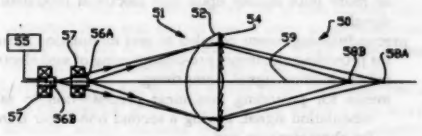
a light source having sufficient coherency to provide a predominate operational center wavelength with at least

one output light beam and including means to vary the output wavelength of said light source,

lens means to focus said light beam to said image point,

means to move said light source at a point along said optical axis to reposition said image point,

said lens means including a diffraction grating means for focusing said output beam irrespective of changes in the position of said light source along said optical axis,



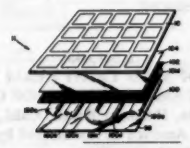
wherein the movement of said light source is accompanied with a concurrent change in the wavelength of said light source to move said image point with said change in wavelength creating an aberration which is opposite in effect to aberration generated due to movement of said light source thereby cancelling one another to produce a substantially aberration-free image.

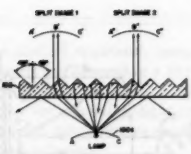
5,161,041

LIGHTING ASSEMBLY FOR A BACKLIT ELECTRONIC DISPLAY INCLUDING AN INTEGRAL IMAGE SPLITTING AND COLLIMATING MEANS

Adiel Abileah, Farmington Hills; Charles Sherman, Royal Oak, and Robert M. Cammarata, Sterling Heights, all of Mich., assignors to OIS Optical Imaging Systems, Inc., Troy, Mich.

Filed Apr. 26, 1990, Ser. No. 514,737
Int. Cl.[5] G02F 1/1335
U.S. Cl. 359—40 **22 Claims**





1. In a backlit liquid crystal display which includes a source of light; a matrix array of rows and columns of liquid crystal picture elements spacedly disposed from one side of said light source; and means for collimating light, said collimating means operatively disposed between said light source and said matrix array of rows and columns of liquid crystal picture elements; said liquid crystal display capable of providing an image to a remotely positioned observer; the improvement comprising, in combination:

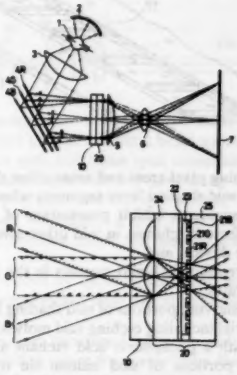
an integral collimating and image splitting means for collimating light from said light source and for refracting light rays emanating from said light source to provide two similar images thereof, thereby enlarging the area effectively illuminated by said light source, whereby a bright, uniform, light distribution is provided in a low profile assembly.

5,161,042

COLOR LIQUID CRYSTAL DISPLAY DEVICE USING DICHROIC MIRRORS FOR FOCUSING DIFFERENT COLORS IN DIFFERENT DIRECTIONS

Hiroshi Hamada, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 28, 1991, Ser. No. 723,299
Claims priority, application Japan, Jun. 28, 1990, 2-171923
Int. Cl.[5] G02F 1/1335
U.S. Cl. 359—41 **13 Claims**



1. A color liquid display device for displaying an image on a display screen, the device comprising:

a light source for generating light;

a plurality of dichroic mirrors for splitting the light into a plurality of light beams of different wavelength ranges;

liquid crystal display element for receiving a plurality of beams of different wavelength ranges, wherein said light beams are incident upon the liquid crystal display element from mutually different directions, the liquid crystal display element including,

liquid crystal driving means for modulating said light beams transmitted therethrough, and

an optical means disposed on the surface of said liquid crystal driving means which is on the light incident side, for focusing said light beams on pixels of the liquid crystal display element so that combined color images can be subsequently formed on the display screen.

5,161,043

METHOD OF FORMING LIQUID CRYSTAL DISPLAY DEVICE WITH MOLYBDENUM SHADING LAYER OVER ITO ELECTRODES

Yozo Narutaki, and Kenichi Nakagawa, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Japan

Continuation of Ser. No. 483,506, Feb. 23, 1990, abandoned. This application Sep. 6, 1991, Ser. No. 758,507
Claims priority, application Japan, Feb. 28, 1989, 1-49091
Int. Cl.[5] G02F 1/13
U.S. Cl. 359—54 **6 Claims**

1. A method of forming a liquid crystal display device having improved brightness contrast between a matrix of pixel areas and areas of the device other than the pixel areas, comprising the steps of:

providing two light transmissive substrates formed of glass;

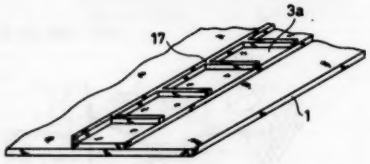
applying a transparent film of conductive material on a surface of each substrate, said conductive material being formed of indium tin oxide;

applying to the conductive material on each substrate a material for forming a shading layer, said shading layer material comprising molybdenum;

removing portions of said shading layer material and said film of conductive material on each substrate to form a plurality of shading layer segments and a plurality of electrodes with the shading layer segments overlying respective portions of the electrodes;

applying an insulating layer over said shading layer segments and said electrodes;

securing said substrate in opposition to each other with the electrodes and the shading layer segments of each substrate forming pixel areas and areas other than pixel areas shaded by said shading layer segments whereby said shading layer segments inhibit penetration of light into and afford uniform brightness in said other areas upon operation of the device; and



disposing ferroelectric liquid crystals in the space between said substrates;

the step of removing portions of said shading layer molybdenum material including etching said molybdenum material portion with a phosphoric acid etchant and the step of removing portions of said indium tin oxide including etching said indium tin oxide with a hydrochloric acid etchant.

5,161,044

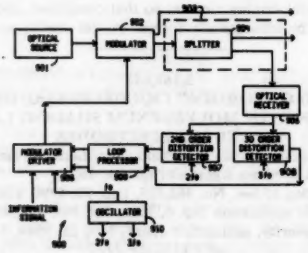
OPTICAL TRANSMITTERS LINEARIZED BY MEANS OF PARAMETRIC FEEDBACK

Moshe Nazarathy, Palo Alto; Josef Berger, and Yishai Kagan, both of Santa Clara, all of Calif., assignors to Harmonic Lightwaves, Inc., Santa Clara, Calif.

Continuation of Ser. No. 378,328, Jul. 11, 1989, abandoned. This application Apr. 15, 1991, Ser. No. 685,966

Int. Cl.[5] H04B *10/00*

U.S. Cl. 359—157 **50 Claims**



1. An optical transmission or distribution system for broadband signals comprising:

an optical transmitter for providing transmitted optical power comprising:

a light source;

an electrical-to-light modulation means for modulating said light having a first non-linear modulation transfer characteristic having an associated shape, there being a bias point on said characteristic, said modulation means including an information signal input for receiving an electrical modulation signal, an output for providing a modulated signal, and means for adjusting said modulation means;

one or more optical receivers;

a fiber optic distribution network for receiving said modulated light and distributing said modulated light to said optical receivers; and

a parametric feedback system comprising:

means coupled to said modulation means to superpose one or more pilot signals upon said electrical modulation signal;

preconditioning means coupled to said modulation means for providing electronic pre-conditioning of said electrical modulation signal, comprising:

means for providing non-linear predistortion to said modulation signal, having a second non-linear transfer characteristic; and

means to adjust said second non-linear transfer characteristic of said pre-conditioning means;

a monitoring optical receiver;

means to route a portion of modulated light to said monitoring optical receiver;

means coupled to said monitoring optical receiver to generate error signals indicative of the deviations of the system away from optimum points of minimal harmonic distortion and intermodulation associated with said system, by monitoring the amounts of distortion generated by interaction of said pilot signals with the overall nonlinearity of said optical transmitter;

means to electronically process said error signals to provide processed error signals; and

means to feed back said processed error signals to said means for providing electronic pre-conditioning in order to adjust the overall transfer characteristic of said means for providing electronic pre-conditioning and said modulation means such that the harmonic distortion and intermodulation components in the spectrum of the modulated signal at the output of said optical transmitter are reduced.

5,161,045

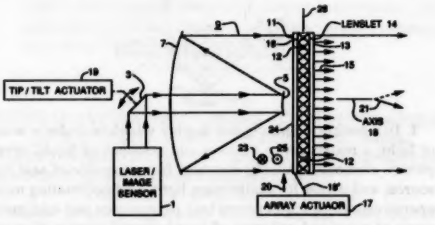
LARGE FIELD OF VIEW LIGHT BEAM TRANSCEIVER HAVING SMALL MOTION OF OPTICS

Richard A. Hutchin, Redondo Beach, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 28, 1990, Ser. No. 545,269

Int. Cl.[5] G02B *26/08, 27/44*

U.S. Cl. 359—197 **7 Claims**



1. A light beam scanner having a given field of view comprising:

(a) a coherent light beams source for generating a coherent light beam;

(b) first and second optically coupled lenslet arrays, each having a plurality of lenslets, and configured to diffract light outputted from said second array into a plurality of diffraction orders where constructive interference be-

tween beamlets produced by the lenslets of said second array will occur;

(c) array actuator means for moving said first and second arrays relative to each other across said light beam for causing said beamlets to illuminate any one of said diffraction orders;

(d) beam director means optically coupled to said coherent light beams source for directing the coherent light beam at said first lenslet array at a given angle of incidence and for changing the angle of incidence of the coherent light beam directed at said first lenslet array, for in turn causing light outputted from said second lenslet array to be redirected within the field of view of the scanner which maintaining constructive interference between said beamlets; and

wherein said first and second lenslet arrays each comprise a two dimensional array of lenslets, and wherein said array actuator means includes means for producing relative motion between said arrays in both X and Y directions.

5,161,046
BEAM POSITION CONTROL APPARATUS

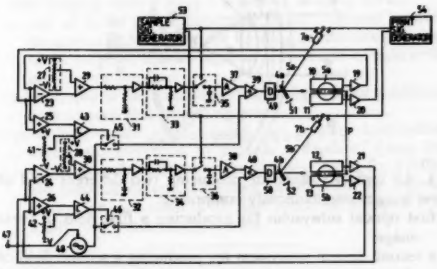
Minoru Ohshima; Shuichi Morio; Susumu Saitoh; Osamu Namikawa; Kazutoshi Obara; Minoru Seino; Takeshi Mochizuki; Makoto Nakura, all of Ibaraki; Akira Arimoto, and Masuo Kasai, both of Tokyo, all of Japan, assignors to Hitachi Koki Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan

Filed Jan. 3, 1991, Ser. No. 635,823

Claims priority, application Japan, Jan. 31, 1990, 2-19045

Int. Cl.[5] G02B *26/08*

U.S. Cl. 359—212 **6 Claims**



1. A beam position control apparatus, comprising:

light generating means for generating a light beam;

a movable reflector;

light detector means for receiving light reflected by said movable reflector and generating an electrical light detector signal responsive thereto;

means for generating an initializing signal;

servo control means for receiving said electrical light detector signal from said light detector means, and processing said signal to move said movable reflector to position said light beam;

said servo control means comprising:

oscillator means for oscillating in response to said initializing signal and producing an output oscillator signal; and

control switch means for receiving said electrical light detector signal and receiving said output oscillator signal, then generating a signal responsive thereto which controls a driver to move said moveable reflectors.

5,161,047
OPTICAL SCANNER FOR IMAGE RECORDING APPARATUS

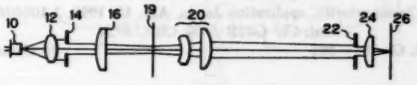
Kan Tomita, Tokyo; Takayuki Ohsawa, Funabashi; Kenichi Takanashi, Inzai, and Osamu Endo, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 14, 1991, Ser. No. 699,940

Claims priority, application Japan, May 15, 1990, 2-124526; Jun. 5, 1990, 2-146825; Jun. 5, 1990, 2-146826; Jun. 5, 1990, 2-146827; Oct. 11, 1990, 2-272933; Oct. 11, 1990, 2-272934; Oct. 11, 1990, 2-272935; Mar. 15, 1991, 3-51647

Int. Cl.[5] G02B *26/10*

U.S. Cl. 359—216 **16 Claims**



1. An optical scanner for focusing light issued from a light source onto a target surface to form a beam spot and scanning said target surface with said beam spot, comprising:

light beam generating means for generating a light beam from the light issued from the light source;

deflecting means for reflecting said light beam from said light beam generating means and deflecting said reflected light beam;

image forming optics for focusing said light beam deflected by said deflecting means onto the target surface as a beam spot;

first aperture means interposed between said light source and said deflecting means for correcting a diameter of said beam spot; and

second aperture means positioned on an optical path between said first aperture means and the target surface for intercepting, at least in a direction corresponding to subscanning, part of diffracted light from said first aperture means which is located outwardly of first minimums appearing on an optical intensity distribution representative of said diffracted light.

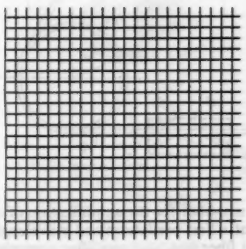
5,161,048
ELECTROCHROMIC WINDOW WITH METAL GRID COUNTER ELECTRODE AND ACIDIC POLYELECTROLYTE

Thomas G. Rukavina, Lower Burrell, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 26, 1990, Ser. No. 633,893

Int. Cl.[5] G02F *1/01*

U.S. Cl. 359—275 **19 Claims**



1. In an article of manufacture having variable transmittance in response to an electric field comprising:

a. a transparent substrate;

b. an electroconductive electrode member;

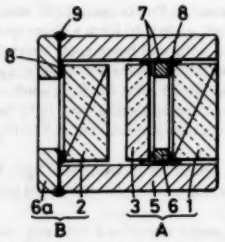
c. a transparent electrochromic film in contact with said electroconductive electrode member;
d. an ion-conductive polymer in contact with said electrochromic film; and
e. a metal grid counter electrode in contact with said ion-conductive polymer;
the improvement which comprises a primer coating on said metal grid comprising a copolymer of acrylamidopropane sulfonic acid and acrylic acid.

5,161,049

OPTICAL ISOLATOR AND METHOD FOR PREPARING SAME

Masayuki Tanno; Toshiaki Watanabe, both of Annaka, and Toshihiko Ryuo, Gunma, both of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Apr. 16, 1991, Ser. No. 686,422
Claims priority, application Japan, Apr. 18, 1990, 2-100404
Int. Cl.[5] G02B *1/09*; C03C *8/24*
U.S. Cl. 359—281 **16 Claims**



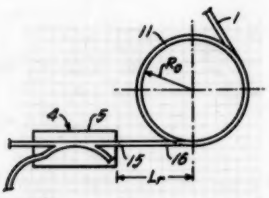
1. An optical isolator which comprises a first polarizer, a Faraday rotator and a second polarizer which are adhered to one another in this order and supported in a cylindrical magnet, wherein the plurality of adhered and supported portions comprise two kinds of low melting point glasses having different transition temperatures.

5,161,050

OPTICAL AMPLIFIER WITH BENT, SINGLE-MODE ACTIVE FIBER

Giorgio Grasso, Monza, and Aldo Righetti, Milan, both of Italy, assignors to Pirelli Cavi S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 602,364, Oct. 22, 1990, and a continuation-in-part of Ser. No. 651,472, Feb. 6, 1991. This application Jan. 16, 1991, Ser. No. 642,221
Claims priority, application Italy, Feb. 12, 1990, 19341 A/90
Int. Cl.[5] H01S *3/30*; G02B *6/10*
U.S. Cl. 359—341 **21 Claims**



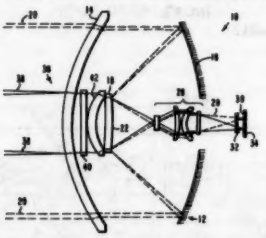
1. An optical amplifier for the amplification of optical transmission signals at a first predetermined wavelength propagating in an optical fiber line, said amplifier comprising:
a pumping energy source for providing pumping energy at a second predetermined wavelength shorter than said first predetermined wavelength;
a dichroic coupler having two inputs and an output, one of said inputs being coupled to said pumping energy source and the other of said inputs being adapted to be connected to said optical fiber line in which said optical transmission signals are propagated;
an active fiber which is long relative to its width and which contains a fluorescent dopant which can be pumped at said second predetermined wavelength and which emits radiation at said first predetermined wavelength, said fiber, in substantially rectilinear configuration, providing single-mode propagation of signals at said first predetermined wavelengths and multi-mode propagation of energy at said second predetermined wavelength and said fiber being coupled at one end to said output of said dichroic coupler and being bent transversely to its length into a curved configuration for at least 70% of its length with a curvature radius such that said fiber in curved configuration provides substantially only single mode propagation therein at said second predetermined wavelength; and
said amplifier being without means for feeding radiation energy at said first predetermined wavelength from the other end of said active fiber to said one end of said active fiber.

5,161,051

SIMULTANEOUS DUAL FIELD OF VIEW SENSOR

Colin G. Whitney, Agoura Hills, and Bruce A. Cameron, Simi Valley, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 13, 1990, Ser. No. 627,164
Int. Cl.[5] G02B *13/14, 17/08*
U.S. Cl. 359—351 **14 Claims**



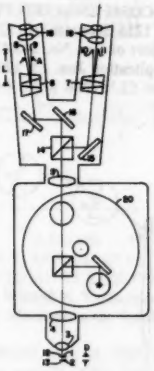
1. An optical system for producing two different field of view images simultaneously comprising:
first optical subsystem for producing a first field of view image;
a second optical subsystem for producing a second field of view image, wherein the angular displacement of said second field of view is different from that of said first field of view;
an optical detector having first and second areas;
dichroic beamsplitter means disposed so as to transmit light from said first optical subsystem, and also disposed so as to simultaneously reflect light from said second optical subsystem, wherein said transmitted light is primarily composed of light of a first wavelength band and said reflected light is primarily composed of light of a second wavelength band;
means for directing said transmitted light onto said first detector area;
means for directing said reflected light onto said first detector area; and
a dual filter disposed in front of said detector having a first filter area adjacent to said first detector area for filtering out substantially all light except for said first wavelength band, and also having a second filter area adjacent to said second detector area for filtering out substantially all light except for said second wavelength band.

5,161,052

STEROSCOPIC TANDEM SCANNING REFLECTED LIGHT CONFOCAL MICROSCOPE

James D. Hill, Mt. Airy, Md., assignor to Tandem Scanning Corporation, Reston, Va.

Filed Mar. 29, 1991, Ser. No. 677,300
Int. Cl.[5] G02B *21/22, 21/06, 27/22*
U.S. Cl. 359—377 20 Claims



1. A stereoscopic scanning reflected light confocal microscope having a scanning disk, a light source and optics for directing light from said source through said scanning device to a specimen and as reflected from a specimen passing light in focus to a viewing station through a conjugate region on said scanning disk opposite the region through which light was directed to the specimen there being an imaging device located at the viewing station, said microscope being characterized by

said imaging device being a binocular imaging device,

a pair of direct vision dispersing prisms disposed between the scanning device and the imaging device along the axis of the reflected light to separate wavelength of light at the imaging device, and

a beam splitter for directing reflected light along a different path to each said dispersing prism,

an objective lens having substantial primary longitudinal chromatic aberration to provide a depth of focus that produces a sharp image at the viewing station for a different distance of said dispersing prism from the viewing station for each color of the light spectrum reflected from a different depth of a specimen.

5,161,053

CONFOCAL MICROSCOPE

Timothy P. Dabbs, West Ryde, Australia, assignor to Commonwealth Scientific & Industrial Research, Campbell, Australia

PCT No. PCT/AU89/00323, § 371 Date Jan. 29, 1991, § 102(e) Date Jan. 29, 1991, PCT Pub. No. WO90/01716, PCT Pub. Date Feb. 22, 1990
PCT Filed Aug. 1, 1989, Ser. No. 613,865
Claims priority, application Australia, Aug. 1, 1988, PI9587
Int. Cl.[5] G02B *21/00*
U.S. Cl. 359—384 72 Claims

1. A diffraction limited confocal microscope comprising:

a light source to provide focussable illuminating energy;

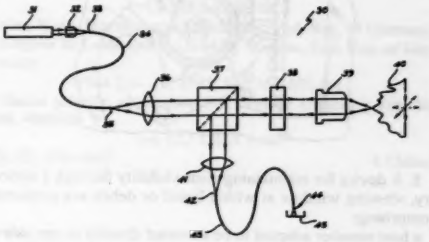
a single mode energy guide comprising a core, an energy receiver and an energy exit:

the energy guide being operatively associated with the light source so that illuminating energy from the light source is received by the energy receiver and coupled into the core and guided to the energy exit so as to emerge from the core at the energy exit;

a first focusser operatively associated with the energy exit to focus at least a portion of the illuminating energy emerging from the core into a diffraction limited spot pattern volume having a central portion which in use intersects an object;

a second focusser operatively associated with the first focusser, and in use with the object, to collect outgoing energy from the volume resulting from interaction between the illuminating energy in the volume and the object and/or resulting from transmission of illuminating energy through the volume;

a detector having an aperture and a detecting element;



wherein the detector is operatively associated with the second focusser whereby the second focusser images the aperture onto the central portion wherein the numerical aperture, NA, of the outgoing energy originating from the central portion focussed onto the aperture, the wavelength of the outgoing energy, λ, and the average diameter, d, of the aperture are related by the equation:

$$NA \leq 0.6 \times \lambda / d$$

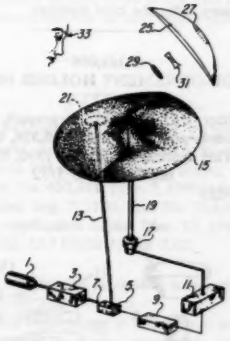
whereby the detector detects the outgoing energy.

5,161,054

PROJECTED VOLUME DISPLAY SYSTEM AND METHOD

Rodney Don Williams Jr., Plano, and Felix Garcia, Jr., both of Roundrock, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 19, 1990, Ser. No. 629,794
Int. Cl.[5] G02B *27/22*
U.S. Cl. 359—462 22 Claims



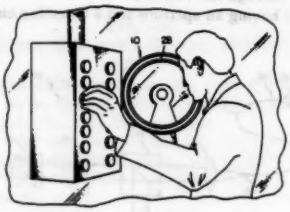
1. A display system which comprises:

(a) an existing volumetric three dimensional display;

(b) a projection surface; and

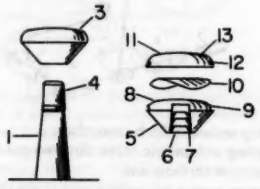
(c) projection optics projecting said three dimensional display onto said projection surface.

5,161,055
ROTATING WINDOW
Wolf J. Blechschmidt, 16421 NE. 18th St., Bellevue, Wash. 98008
Filed Sep. 3, 1991, Ser. No. 753,807
Int. Cl.[5] G02B *27/00*; E06B *7/28*
U.S. Cl. 359—508 7 Claims



1. A device for maintaining clear visibility through a stationary, viewing window at which liquid or debris are projected, comprising:
a base member adapted to be mounted directly to one side of a stationary window;
a rotating window rotatably coupled to said base member and having a peripheral groove;
means for securing said base member to only said one side of said stationary window, said securing means contacting only said one side of said stationary window such that there is no need of a hole in said stationary window to mount the base member to said stationary window and complete structural integrity of the stationary window is therefore maintained;
means for rotating the rotating window to sling off any water or debris that comes in contact with said rotating window; and
safety means for preventing the rotating window from being thrown from the base member in the event the rotating window becomes rotatably disconnected from the base member, said safety means comprising a plurality of screws secured to the base member around the periphery of the rotating window, each screw having a head corresponding to said peripheral groove in the rotating window such that during normal operation, the rotating window rotates unimpededly inside of the screws, but in the event the rotating window becomes rotatably disconnected from the base member, the screw heads engage the peripheral groove to prevent the rotating window from being thrown away from the base member.

5,161,056
REFLECTOR-ORNAMENT HOLDER FOR VEHICLE WHEELS
Matthew J. Sitter, P.O. Box 657, Shreveport, La. 71119
Continuation-in-part of Ser. No. 260,316, Oct. 20, 1988, abandoned. This application Jul. 26, 1990, Ser. No. 559,404
Int. Cl.[5] G02B *5/12*
U.S. Cl. 359—533 9 Claims



1.An apparatus for mounting visible images or an image producing element to an inflatable tire valve stem comprising a body, a means for mounting said body to said valve stem, and a lens; said lens suitably attached to said body as to cover, protect and retain said images or image producing element to said body; said images or image producing element further comprising a reflective material, said reflective material further comprising retro-reflective tape.

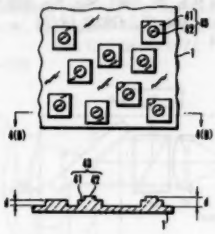
5,161,057
DISPERSION-COMPENSATED FRESNEL LENS
Kenneth C. Johnson, 1215 Brewster Dr., El Cerrito, Calif. 94530
Continuation-in-part of Ser. No. 243,419, Sep. 12, 1988, abandoned. This application Jun. 13, 1990, Ser. No. 537,230
Int. Cl.[5] G02B *5/18, 3/08*
U.S. Cl. 359—566 2 Claims

1. A dispersion-compensated Fresnel lens which accepts a polychromatic, dispersionless input beam having a specific wavefront form and transforms it into a polychromatic output beam substantially of a specific desired wavefront form with minimal dispersion, wherein:
at least one side of the lens comprises large-scale Fresnel lens facets which affect the form of the output beam through the effects of refraction;
at least a portion of one side of the lens comprises a plurality of dispersion-compensating gratings that function to mitigate the lens's chromatic dispersion;
each of said gratings is formed as a surface relief pattern comprising small-scale grating facets superimposed on a respective one of said large-scale lens facets, wherein the grating surface affects the form of the output beam through the combined effects of refraction and diffraction;
each of said gratings has a substrate shape and facet zone structure configured so that the lens exhibits significantly less dispersion than it would without the gratings; and
each of said gratings has a Fresnel-type blazed facet structure which optimizes its first-order diffraction efficiency over a desired spectrum.

5,161,058
FOCUSING SCREEN
Hiroshi Matsui, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 555,808, Jul. 23, 1990, abandoned, which is a continuation of Ser. No. 359,487, May 31, 1989, abandoned. This application Jun. 11, 1991, Ser. No. 713,611
Claims priority, application Japan, May 31, 1988, 63-134126; May 31, 1988, 63-134127
Int. Cl.[5] G03B *13/24*; G02B *5/18*
U.S. Cl. 359—574 10 Claims

1. A phase type focusing screen comprising an optically transparent base plate and a plurality of minute protrudent and/or recessed parts of a predetermined shape and irregularly allocated on a surface of said base plate, in which assuming that a stepped level difference between the surface of said base plate and a top face of said protrudent part of a bottom face of said recessed part is d, a refractive index of a material of said

base plate is n and the shortest wave length within a working wave length region is λ, the following condition is satisfied:



$d \geqq 1.5\lambda/(n-1)$.

5,161,059

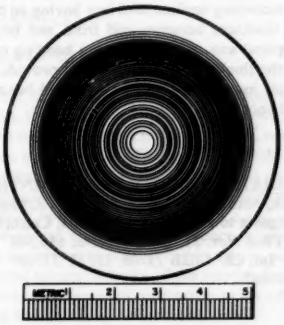
HIGH-EFFICIENCY, MULTILEVEL, DIFFRACTIVE OPTICAL ELEMENTS

Gary J. Swanson, and Wilfrid B. Veldkamp, both of Lexington, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 99,307, Sep. 21, 1987, Pat. No. 4,895,790. This application Aug. 29, 1989, Ser. No. 399,848

Int. Cl.[5] G02B *3/08, 27/44;* **B41M** *5/00*

U.S. Cl. 359—565 **10 Claims**



1. High-efficiency, diffractive optical element having at least one surface including multilevel steps, the steps determined by calculating equiphase boundaries utilizing the equation

$$\phi(x, y) = \frac{2\pi}{\lambda} \sum_{n,m} a_{nm} x^n y^m,$$

where x and y denote coordinates on the optical element, λ denotes wavelength, and a_{nm} represents a series of optimized coefficients, and the algorithm

Level #N	Equiphase Boundaries ($l = 0, \pm1, \pm2, \ldots$)	Phase Etch Depth θ
1	$\phi(x, y) = (l + 1)\pi$	π
2	$\phi(x, y) = \frac{(l + 1)\pi}{2}$	$\frac{\pi}{2}$
3	$\phi(x, y) = \frac{(l + 1)\pi}{4}$	$\frac{\pi}{4}$

-continued

Level #N	Equiphase Boundaries ($l = 0, \pm1, \pm2, \ldots$)	Phase Etch Depth θ
4	$\phi(x, y) = \frac{(l + 1)\pi}{8}$	$\frac{\pi}{8}$.

5,161,060

CAMERA LENS

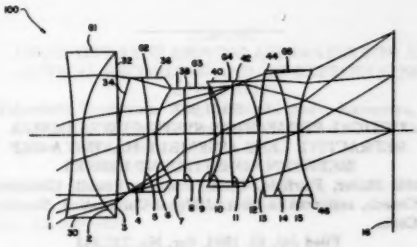
Walter Watz, Huettenberg-Reiskirchen, Fed. Rep. of Germany, assignor to Leica Camera GmbH, Wetzlar, Fed. Rep. of Germany

Filed Feb. 15, 1991, Ser. No. 656,411

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1990, 4005300

Int. Cl.[5] G02B *9/60*

U.S. Cl. 359—642 **4 Claims**



1. A camera lens having a relative aperture of 1:1.4 and a focal length of 35 mm, said camera lens comprising:

(a) a first component having a cemented element which is concave on an object side;

(b) a second component having a cemented element which includes an aspherical convex surface on said object side;

(c) a diaphragm;

(d) a third component serving as an individual lens;

(e) a fourth component having a cemented element which is concave on said object side; and

(f) a fifth component having a cemented element which includes a concave surface on an image side and having an aspherical convex surface on said object side.

5,161,061

COMPOUND ASPHERICAL LENS

Yuji Ihara, Kawasaki, and Hiroshi Tanioka, Kashiwa, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

Continuation of Ser. No. 492,531, Mar. 7, 1990, abandoned. This application Aug. 7, 1991, Ser. No. 742,068

Claims priority, application Japan, Mar. 13, 1989, 1-29040

Int. Cl.[5] G02B *11/00, 7/02*

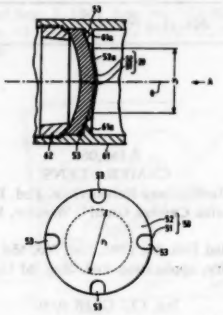
U.S. Cl. 359—708 **8 Claims**

1. A compound lens having an optical axis and comprising:

a hard lens member; and

a soft lens member superposed to one side of said hard lens member in a direction of the optical axis; said hard lens member having a periphery portion radially projecting outside an effective diameter of said hard lens member at said one side and being exposed in the direction of the optical axis when said soft lens member is superposed to said hard lens member, wherein each of said hard lens

member and said soft lens member is in the form of a cylindrical shape having substantially the same outer



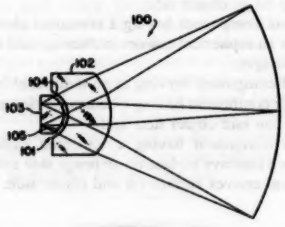
diameter and said periphery portion is formed by cuts in a surface of said soft lens member.

5,161,062

OPTICAL PROJECTION SYSTEM INCLUDING A REFRACTIVE LENS ASSEMBLY HAVING A GAP BETWEEN CONSTITUENT LENSES

David Shafer, Fairfield, Conn., and Ian Powell, Gloucester, Canada, assignors to General Signal Corporation, Stamford, Conn.

Filed Jul. 11, 1991, Ser. No. 728,343
Int. Cl.[5] G02B *17/00*
U.S. Cl. 359—785 **18 Claims**



1. A photolithographic projection optical system comprising: a source of exposure energy for generating a beam of energy; an optical element located in the path of said beam for receiving said beam of energy and passing a portion of said beam therethrough; a refractive lens assembly located in the path of said portion of said beam for receiving and transmitting said beam of energy; a reticle element located in the path of said beam, said reticle element having a uniform thickness, said reticle element being positioned for permitting said beam to pass through said thickness and said lens assembly to said optical element, wherein the improvement comprises:

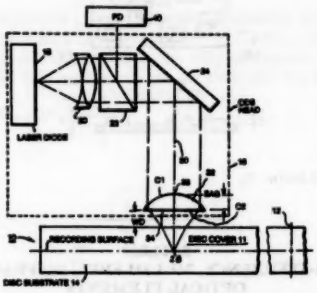
said refractive lens assembly comprising at least one meniscus lens, a plano-convex lens, said lenses being disposed to have substantially concentric, confronting surfaces; and a monocentric gap for achieving spherical aberration correction, said gap being essentially defined by the close spacing between said substantially concentric, confronting surfaces of said meniscus lens and said plano-convex lens.

5,161,063

OBJECTIVES FOR AN OPTICAL DATA STORAGE HEAD

Daniel M. Krill, Rochester, and Duncan T. Moore, Fairport, both of N.Y., assignors to University of Rochester, Rochester, N.Y.

Filed Feb. 21, 1991, Ser. No. 659,197
Int. Cl.[5] G02B *13/18*
U.S. Cl. 359—654 **18 Claims**



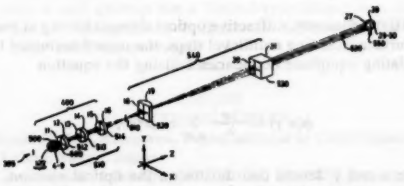
1. An objective for an optical data storage head which focuses a laser beam at a spot on an optical recording surface through a cover which presents a thickness of transparent material over said recording surface, which objective is disposed at a working distance from said surface and which is characterized as being a gradient index singlet having a front surface of curvature c1 and a back surface of curvature c2, said front and back surfaces respectively facing away from and toward said recording surface, said lens having an optical axis, a maximum thickness between said front and back surfaces along said optical axis, said lens having bending c2/c1 being selected for the thickness of said cover to provide correction for aberrations imposed by said lens on said beam when focused to said spot.

5,161,064

RADIATION SOURCE FOR A PRINTER

Peter P. Clark, Acton, and Carmina Londono, Arlington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 21, 1990, Ser. No. 616,348
Int. Cl.[5] G02B *13/08, 13/18, 27/42*
U.S. Cl. 359—663 **11 Claims**



1. A source of radiation for use in printing on a recording medium, said source comprising:

at least one laser diode array having near and far field radiation distributions; and

an optical system which is telecentric in at least one azimuth for providing an image of said near field distribution from said laser diode array substantially on the medium, said telecentric optical system comprising:

an illuminator for providing a first image of said near field distribution at an intermediate image plane; and

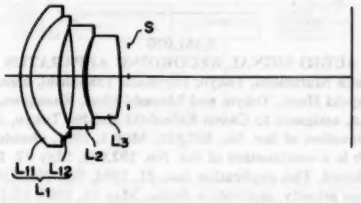
an optical system for reimaging said first image on the medium.

5,161,065

BEHIND STOP WIDE ANGLE LENS SYSTEM

Koichi Ohshita, Tokyo, Japan, assignor to Nikon Corporation, Tokyo, Japan

Continuation of Ser. No. 680,252, Apr. 4, 1991, abandoned. This application Feb. 5, 1992, Ser. No. 830,452
Claims priority, application Japan, Apr. 25, 1990, 2-109292
Int. Cl.[5] G02B *9/18*
U.S. Cl. 359—739 4 Claims



1. A behind stop wide angle lens comprising a positive lens L_1 formed by joining a negative meniscus lens L_{11} whose convex surface faces an object and a positive meniscus lens L_{12} whose convex surface faces the object, a biconcave negative lens L_2, a biconvex positive lens L_3 and an aperture stop S, disposed in this order from the object side, and meeting the following conditions:

$$0.27f<\Sigma d<0.37f \quad (1)$$

$$2.6<f_1/f_3<4.0 \quad (2)$$

$$3.8<d_3/d_5<5.5 \quad (3)$$

$$0.2<\Sigma N_p-\Sigma N_n<0.35 \quad (4),$$

wherein f, f_1 and f_3 designate the focal length of the whole system, the focal length of said joint lens L_1 and the focal length of said biconvex positive lens L_3, respectively, and Σd, d_3, d_5, ΣN_p and ΣN_n designate the distance between a surface in said lens system nearest to the object and a surface nearest to an image along the optical axis, the axial air space between said joint lens L_1 and said biconcave negative lens L_2, the axial air space between said biconcave negative lens L_2 and said biconvex positive lens L_3, the total refractive index of the positive lenses in the lens system, and the total refractive index of the negative lenses in the lens system, respectively.

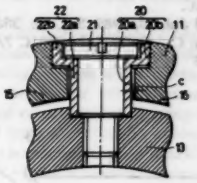
5,161,066

ENGAGING MECHANISM OF ROLLER AND GUIDE GROOVE IN OPTICAL ELEMENT

Hitoshi Tanaka, and Katsumori Kikuchi, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 17, 1990, Ser. No. 627,839
Claims priority, application Japan, Dec. 25, 1989, 1-147763[U]
Int. Cl.[5] G02B *15/00*
U.S. Cl. 359—823 14 Claims

1. In an optical device having an optical element which has a guide groove and a roller which is movably fitted in the guide groove, wherein the provision is made to an engaging mechanism of the roller and the guide groove in which said guide groove is a stepped guide groove having an inner narrow groove portion and an outer wide groove portion, said roller being provided with an outer larger diameter portion which is fitted in the outer wide groove portion of the stepped guide groove and an inner small diameter portion which is fitted in the inner narrow groove portion of the stepped guide



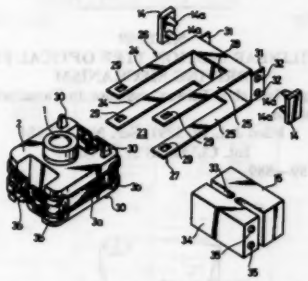
with a clearance therebetween so as not to come into contact with the wall surface of the inner narrow groove portion.

5,161,067

OBJECTIVE LENS DRIVING APPARATUS FOR AN OPTICAL RECORDING AND/OR REPRODUCING APPARATUS

Takamichi Tomiyama, Tokyo; Hitoshi Nara, Kanagawa, and Osamu Adachi, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 13, 1990, Ser. No. 508,558
Claims priority, application Japan, Apr. 20, 1989, 1-101258
Int. Cl.[5] G02B *7/02*; G11B *7/00*
U.S. Cl. 359—824 4 Claims



1. An optical pickup device with an objective lens movable in two directions, said optical pickup device comprising:

supporting means for supporting a bobbin on which an objective lens is mounted, said supporting means comprising a supporting member formed of a thin metal plate having a predetermined rigidity for supporting said bobbin so that said bobbin may be moved in a first direction parallel to an optical axis of said objective lens and a second direction perpendicular to the optical axis of said objective lens;

electromagnetic driving means for driving said bobbin so that said bobbin is selectively moved in either of said first and second directions, wherein said supporting member is unitarily formed of four substantially parallel arm portions having first and second ends, said bobbin being supported adjacent to said first ends of said four arm portions, and a coupling portion for coupling said four arm portions adjacent to said second ends of said four arm portions; and

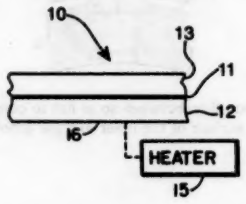
a fixed base portion connected adjacent to said second ends of said four arm portions.

5,161,068

SUPERCONDUCTING SEARCHING FILTER

Robert J. Spry, Tipp City, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 20, 1989, Ser. No. 386,798
Int. Cl.[5] G02B 5/24; H01C 7/16
U.S. Cl. 359—885 37 Claims



1. An optical filter structure for selectively blocking radiation of predetermined wavelength comprising:

(a) a first layer of dielectric material; and

(b) a plurality of multipole elements in predetermined periodic array and spacing on said first layer, each multipole element including:

(i) a central element of predetermined length, width and thickness and of shape generally corresponding to that characterizing each multipole element;

(ii) a plurality of abutting segments disposed adjacent said central element, said segments having predetermined length and width corresponding substantially to that of said central element; and

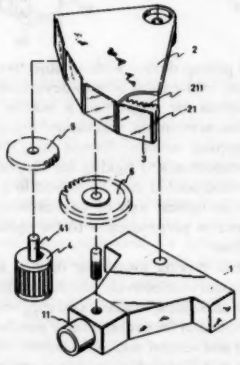
(iii) each of said central element and segments comprising transition material, characterized by a transition from superconducting phase to insulating phase upon being heated to a characteristic transition temperature.

5,161,069

CURVILINEAR MOTION TYPE OPTICAL FILTER DRIVING MECHANISM

Fu Jowang, Hsin chu, Taiwan, assignor to Tamarack Telecom Inc., Taiwan

Filed Jul. 19, 1991, Ser. No. 733,184
Int. Cl.[5] G02B 5/20, 26/00
U.S. Cl. 359—889 1 Claim



1. An optical filter assembly including a driving mechanism, comprising:

a lens-house having a lens at the front;

a filter holder mounted on said lens-house at the top, said filter holder having a curved rack below a front edge of the filter holder;

an optical filter fixedly mounted on said filter holder and disposed in front of said lens;

a motor having an output shaft;

a drive gear driven by said output shaft of said motor;

a driven gear mounted on said lens-house at the top end engaged between said drive gear and said rack; and

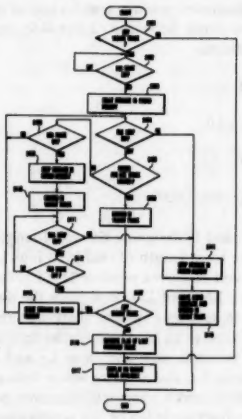
characterized in that rotating said motor causes said drive gear to carry said optical filter, via said driven gear and said rack, to make a curvilinear motion over said lens.

5,161,070

AUDIO SIGNAL RECORDING APPARATUS

Tomotaka Muramoto, Tokyo; Hirokazu Takahashi, Kanagawa; Hiroyuki Horii, Tokyo, and Masashi Hori, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 697,911, May 1, 1991, abandoned, which is a continuation of Ser. No. 192,949, May 12, 1988, abandoned. This application Jan. 21, 1992, Ser. No. 824,697
Claims priority, application Japan, May 16, 1987, 62-119552; May 16, 1987, 62-119800
Int. Cl.[5] G11B 5/09
U.S. Cl. 360—8 12 Claims



1. A recording apparatus for recording a continuous information signal in a plurality of memory blocks, comprising:

(a) generating means for generating a pause start command and a pause release while information recording is in progress;

b) storing means for storing said continuous information temporarily;

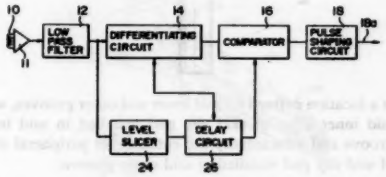
(c) recording means for recording said continuous information stored in said storing means in said memory blocks, said recording means being arranged to record said continuous information together with an end signal of said continuous information; and

(d) means associated with the pause start command generated by said generating means for causing said recording means to record the continuous information stored in said storing means, without recording said end signal, when said pause start command is generated, said means being responsive to the storage of said continuous information in said storage means for a predetermined period to cause said recording means to record said continuous information stored in said storage means, and said means being arranged to record said end signal when the pause condition by said pause start command is not released and a record terminating command is given.

5,161,071
READING CIRCUIT USED FOR FLOPPY DISK UNIT

Akira Nakamura, Kyoto, Japan, assignor to Rohm Co., Ltd., Kyoto, Japan

Filed Jul. 25, 1990, Ser. No. 557,017
Claims priority, application Japan, Aug. 3, 1989, 1-202563
Int. Cl.[5] G11B *5/09*
U.S. Cl. 360—46 **7 Claims**



1. A reading circuit used for a floppy disk unit capable of reading data by converting data stored upon a surface of a floppy disk in the form of magnetic variations of a residual magnetism into voltage variations by using a magnetic head, said reading circuit comprising:

(a) a magnetic head capable of reading data recorded in the form of magnetic variations upon the surface of a floppy disk as in the form of voltage variations;

(b) a differentiating circuit for providing a differentiated voltage signal read by said magnetic head with a predetermined differential property, said predetermined differential property being a phase shift of the differentiated voltage signal;

(c) a level slicer, connected in parallel with said differentiating circuit, for producing pulses when the differentiated voltage signal read by said magnetic head exceeds a predetermined threshold level;

(d) a delay circuit for delaying pulses output from said level slicer by the phase shift period of the differentiated voltage signal;

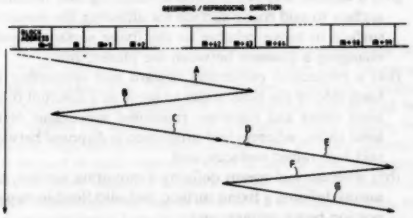
(e) a comparator for detecting a zero level of the differentiated voltage signal only when the delayed pulses from said delay circuit are being input into said comparator; and

(f) a shaping circuit for shaping pulses output from said comparator.

5,161,072
INFORMATION RECORDING/REPRODUCING APPARATUS FOR RECORDING INFORMATION AND VERIFYING RECORDED INFORMATION

Takaharu Ai, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 24, 1990, Ser. No. 602,572
Claims priority, application Japan, Oct. 27, 1989, 1-280901
Int. Cl.[5] G11B *5/09, 27/36, 3/90*
U.S. Cl. 360—53 **3 Claims**



1. An information recording/reproducing apparatus with recorded data verification capability comprising:

recording means for recording information on a disc-like recording medium rotatable by rotating means;

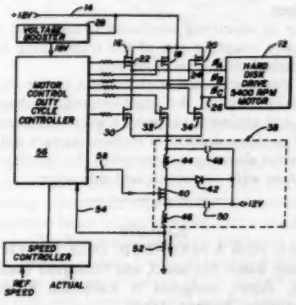
reproducing means for reproducing the information recorded on said disc-like recording medium by said recording means; and

control means for controlling said recording means and said reproducing means so as to record the information on said disc-like recording medium and reproduce the information recorded thereon for verification of the recorded information, said control means dividing the information to be recorded into two or more portions so that a first division portion is successively recorded over a first group of a plurality of blocks successively formed circumferentially on said disc-like recording medium and then reproduced for verification before a second division portion is successively recorded over a second group of blocks which are consecutive to said first group of blocks and then reproduced for verification, the recording and reproduction being continuously effected up to a last division portion, wherein when verifying the first division portion through a penultimate division portion, only a final group of one or more blocks of a just recorded division portion are verified after recording a successive division portion together with blocks of the successive division portion other than a final group of one or more blocks of the successive division portion, and all blocks of the last division portion are verified together with non-verified blocks from said penultimate division portion.

5,161,073
LOW POWER DISK DRIVE SPINDLE MOTOR CONTROLLER

Bipin V. Gami, Northridge, and Russell H. Jacobs, Thousand Oaks, both of Calif., assignors to Micropolis Corporation, Chatsworth, Calif.

Filed Jul. 20, 1990, Ser. No. 556,575
Int. Cl.[5] G11B *19/28, 19/00*
U.S. Cl. 360—73.03 **20 Claims**



1. A high efficiency, switching regulator type hard disk storage system comprising:

a hard disk drive assembly including storage disks and a permanent magnet motor having a multiple phase stator;

switching circuit means electrically connecting a power source and each phase of said multiple phase stator for electrically connecting electrical power to said multiple phase stator;

a switching regulator circuit including an n-channel field effect switching transistor connected between said switching circuit means and ground; and

means for applying substantially constant high frequency pulse switching signals to said n-channel field effect switching transistor, said pulse switching signals providing a varying duty cycle to vary the power supplied from

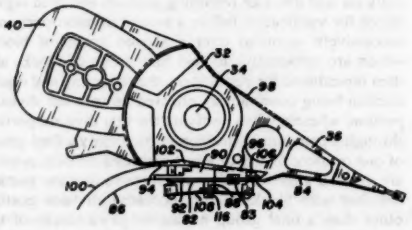
said power source to said multiple phase stator of said motor.

5,161,074

FLEXIBLE RETAINER FOR CANTILEVERED MATRIX BOARD

Kent J. Forbord, Roseville, and Mehdi S. Haidari, Eden Prairie, both of Minn., assignors to Seagate Technology, Inc., Scotts Valley, Calif.

Filed Dec. 21, 1990, Ser. No. 632,150
Int. Cl.[5] G11B *5/012*
U.S. Cl. 360—97.01 **18 Claims**



1. A rotary actuator for a disk drive including:
a substantially rigid carriage mounted to pivot on a pivot axis relative to a stationary disk drive frame;
a plurality of transducer support arms extended away from the carriage in cantilever fashion and having respective end portions remote from the carriage to support a plurality of magnetic transducing heads, respectively, for arcuate travel as the carriage pivots, said support arms being arranged in spaced apart and stacked relation to one another with respective side edges of the arms substantially aligned with one another;
an electrical circuit package, and a fastening means for securing the electrical circuit package with respect to the carriage, with a cantilevered package section of the electrical circuit package extended in cantilever fashion away from the carriage and along the support arms adjacent the side edges;
a plurality of electrical conductors, each said conductor electrically coupling one of the transducing heads with the electrical circuit package; and
a biasing means mounted with respect to the carriage, for continually urging the cantilevered package section toward and against the support arms to maintain the cantilevered package section in surface contact with the side edges while allowing movement of the cantilevered package section with respect to said side edges.

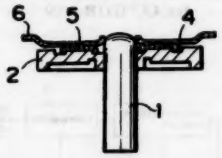
5,161,075

HUB TABLE FOR A MAGNETIC DISK DRIVE DEVICE

Takashi Kanai; Kunio Miyazaki, and Masayuki Tsuzuku, all of Komagane, Japan, assignors to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Continuation of Ser. No. 413,735, Sep. 28, 1989, abandoned. This application Jul. 5, 1991, Ser. No. 727,384
Claims priority, application Japan, Sep. 28, 1988, 63-126706[U]
Int. Cl.[5] G11B *5/016*
U.S. Cl. 360—99.04 **14 Claims**

1. A hub table, comprising:
a rotatable spindle carrying a spindle hub for rotation therewith, said spindle hub including a contacting surface for receiving a metallic disk hub disposed at the center of a flexible magnetic disk;
means magnetizing said spindle hub to magnetically attract said metallic disk hub so that said magnetic disk is driven to be rotated in unison with the spindle hub;
inner and outer grooves formed on said surface, said inner groove being adjacent said spindle and said outer groove being spaced outwardly therefrom; and
a slip pad having an inner edge and an outer, peripheral edge, said slip pad being adhesively secured to said surface



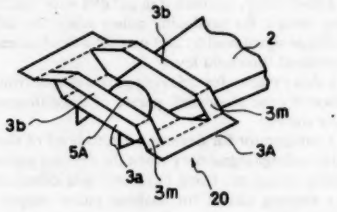
at a location defined by said inner and outer grooves, with said inner edge of said slip pad installed in said inner groove and substantially the entire outer peripheral edge of said slip pad installed in said outer groove.

5,161,076

MAGNETIC HEAD SLIDER SUSPENSION APPARATUS AND METHOD OF FABRICATION

Mitsuo Inumochi; Tsukasa Matsuura; Shinsuke Yura, and Munehito Kumagai, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 12, 1990, Ser. No. 537,047
Claims priority, application Japan, Jun. 13, 1989, 1-150256
Int. Cl.[5] G11B *5/48, 21/16*
U.S. Cl. 360—104 **17 Claims**



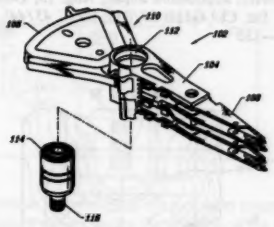
1. A head suspension for accessing a storage medium, comprising:
(a) a head slider having two opposing sides, one side being a slider side facing the storage medium and the other side being a back side;
(b) a flexure for mounting thereon the head slider and allowing for rotational movement of the head slider, said flexure including:
(b1) means defining a mounting surface for receiving said head slider and having two raised surfaces defining a first plane;
(b2) means defining a fixing surface defining a second plane, wherein said planes are substantially parallel;
(b3) a flexible stepped portion connecting said mounting surface to said fixing surface for allowing the mounting surface to move relative to the fixing surface thereby changing a distance between the planes; and
(b4) a projection projecting toward and contacting the back side of the head slider to serve as a fulcrum of the head slider and allowing rotational movement of the head slider, wherein said projection is disposed between said two raised surfaces; and
(b5) wherein said means defining a mounting surface, said means defining a fixing surface, and said flexible stepped portion being unitary; and
(c) a load beam connected to and supporting the fixing surface.

5,161,077

ACTUATOR ARM WITH A STEEL SLEEVE FOR THERMAL OFF TRACK COMPENSATION

Iraj Jabbari, Santa Clara County, Calif., assignor to Seagate Technology, Inc., Scotts Valley, Calif.

Filed Nov. 9, 1990, Ser. No. 611,300
Int. Cl.[5] G11B 5/55
U.S. Cl. 360—106 4 Claims



1. An improved disc drive actuator arm assembly having a substantially triangular actuator arm having a first end and a second end, motor means attached to said first end of said arm for rotatably moving said actuator arm, transducer means attached to said second end of said actuator arm for reading and writing information to a disc, and a stationary shaft surrounded by a bearing system which cooperates with said actuator arm to provide pivotal motion of said actuator arm about said shaft upon activation of said motor means, wherein said improvement comprises:

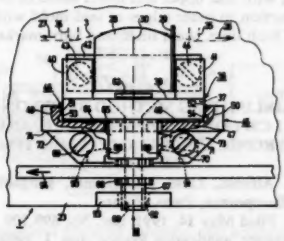
a steel sleeve disposed between said bearing system and said actuator arm defining a pivot bore located centrally between said first and second ends of said actuator arm.

5,161,078

MAGNETIC TAPE SYSTEM INCLUDING A ROTATABLE HEAD SUPPORT FOR ROTATING THE MAGNETIC HEAD OF THE SYSTEM THROUGH SUBSTANTIALLY 180°

Johann Veigl, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 6, 1990, Ser. No. 534,212
Claims priority, application Austria, Jun. 6, 1989, 1384/89
Int. Cl.[5] G11B 5/55
U.S. Cl. 360—106 2 Claims



1. In a magnetic tape system including a magnetic tape with two track regions, a magnetic head which can be turned through substantially 180° between two scanning positions, each position being assigned to a respective one of said two track regions for scanning each associated track region, said magnetic tape being movable in two tape running directions with respect to said magnetic head to enable said scanning, a rotatable head support supporting the magnetic head, said system including a bearing device with a bearing opening, said head support being loosely mounted in said bearing device, an adjusting device for said head support which can rotate said head support between two operating positions whereby said magnetic head is turned between its two scanning positions, said system also including positioning devices for positioning said head support in its two operating positions, a load exerting device for exerting a pressing force to a bearing surface of said head support in both operating positions of the head support, said load exerting device also pressing said positioning devices together, said bearing device including clearances in the bearing opening for said head support, said bearing surface of said head support being pressed against respective bearing locations in the bearing opening for each of the operating positions of the head support, said bearing locations and said bearing surface making point-like contact when pressed against each other, said bearing opening being formed with straight bounding walls, and said predetermined bearing locations being located on said straight bounding walls, wherein the improvement comprises:

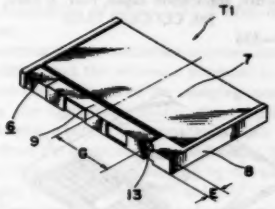
that in each of the operating positions of the head support a frictional force exerted by the magnetic tape moving over the magnetic head adds to the pressing force exerted by the load exerting device on the head support in pressing it against a respective one of said bearing locations.

5,161,079

TAPE CASSETTE WITH SLIDABLE SHUTTER

Mineo Ohshima, Yawata, and Akinobu Fujikawa, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 16, 1991, Ser. No. 640,734
Claims priority, application Japan, Jan. 19, 1990, 2-11289; Feb. 22, 1990, 2-41789; Feb. 28, 1990, 2-47598
Int. Cl.[5] G11B 23/08
U.S. Cl. 360—132 8 Claims



1. A tape cassette comprising:

a shell housing having a longitudinally extending front face, upper and lower surfaces, and a longitudinally extending guide groove formed in one of said upper and lower surfaces, said shell housing including a tape storage portion for storing a magnetic tape therein and having a pair of reel insertion holes formed therein, and a window portion which is of substantially the same thickness as said tape storage portion, a magnetic head insertion window and a pinch roller insertion window being formed in said front face of said shell housing at said window portion thereof;

a shutter member having a U-shaped cross section, a longitudinally extending front portion, a longitudinally extending top portion, and a longitudinally extending bottom portion, and including a guide member mounted one of said top and bottom portions and slidably mounted in said guide groove, such that said shutter member is slidable along said front face of said shell housing between an opening position and a closing position;

shutter urging means for urging said shutter member toward said closing position;

wherein said shell housing includes a coupling portion, for engaging with a shutter opening/closing member of a magnetic recording/reproducing apparatus, at said front face thereof and at a longitudinal positional along said front face which is adjacent a longitudinal end of said

shutter member when said shutter member is in said closing position;

wherein an edge of said coupling portion is disposed at least 34 mm in a longitudinal direction from a longitudinal central position between said pair of reel insertion holes;

wherein said shutter member has a pinch roller insertion opening formed in said front portion thereof at a longitudinal position therealong at which said pinch roller insertion opening of said shutter member registers with said pinch roller insertion window of said shell housing when said shutter member is in said opening position; and

wherein said shutter member a recess formed in one of said top and bottom portions thereof and extending rearwardly from said pinch roller insertion opening, the other of said top and bottom portions of said shutter member being solid at a location thereof adjacent said pinch roller insertion opening.

5,161,080

REDUCED FRICTION DISC CARTRIDGE SHUTTER SURFACES

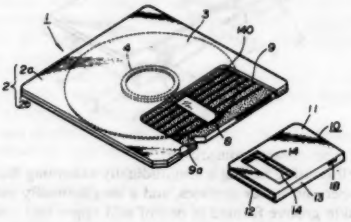
Masanori Funayama, and Shuichi Kikuchi, both of Miyagi, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 30, 1990, Ser. No. 605,936

Claims priority, application Japan, Nov. 2, 1989, 1-128797[U]

Int. Cl.[5] G11B *23/03*

U.S. Cl. 360—133 **14 Claims**



1. A disk cartridge rotatably accommodating a disk therein, comprising

a main cartridge body consisting of an upper half and a lower half,

a pair of head inserting openings formed in the upper and lower halves,

a shutter formed of synthetic resin and mounted on the main cartridge body and moveable in a sliding direction parallel to a front side of the main cartridge body and along outer sides of the main cartridge body, the shutter being constituted by upper and lower surface sections for covering and uncovering the head inserting openings when the shutter is slid between a first position and a second position, and a side plate section interconnecting the upper and lower surface sections, and

a succession of alternating projections and recesses formed on portions of at least one of an outer surface of the main cartridge body or inner surfaces of the shutter, at a point where the shutter is in sliding contact with the main cartridge body, wherein the projections and recesses are aligned to extend parallel to the shutter sliding direction.

5,161,081

DISK CARTRIDGE MADE BY INJECTING MOLTEN SYNTHETIC RESIN INTO A MOLD SO THAT FLASH LINES, WELD LINES AND BURN MARKS DO NOT OCCUR

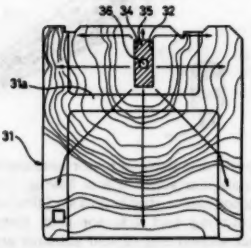
Tetsuo Machida, Miyagi, and Tatsuya Yamazaki, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 392,357, Aug. 11, 1989, abandoned. This application Nov. 27, 1991, Ser. No. 800,884

Claims priority, application Japan, Aug. 13, 1988, 63-202110

Int. Cl.[5] G11B *23/033*; B29C *45/44*

U.S. Cl. 360—133 **1 Claim**



1. A product by process comprising a disk cartridge having:

a substantially square case in which a disk is rotatably accommodated, and which comprises an upper half and a lower half, each of said upper and lower half comprising:

a planar plate portion with outer rib portions made of synthetic resin, having an upper surface and a lower surface;

a head insertion opening which extends completely through said planar plate portion and located such that it does not extend to edges of said planar plate portion;

said head insertion opening enclosed by a surface which connects said upper surface to said lower surface of said plate portion; and

said planar plate portion made by a process wherein it is molded in a planar cavity of a mold from molten synthetic resin, a gate is provided in said mold which has the same dimensions as said head insertion opening and which corresponds to the location of the head insertion opening, and molten resin is injected through said gate into said cavity from said head insertion opening such that said molten resin flows from said gate outwardly in all directions and with a thickness of said planar plate portion parallel with said upper and lower surfaces of said planar plate portion to outer edges of said mold without formation of flash lines, weld lines, and burn marks.

5,161,082

OVERLOAD-LIMITING METHOD BASED ON THE PWM (OR LC3) CONTROL TECHNIQUE, AND AN ELECTRONIC CIRCUIT IMPLEMENTING THE METHOD

Manuel M. Alfonso, Lisse, Netherlands, assignor to Agence Spatiale Europeenne, Paris, France

Filed May 14, 1991, Ser. No. 699,709

Claims priority, application France, Jun. 1, 1990, 90 06862

Int. Cl.[5] H02H *7/00, 3/20*

U.S. Cl. 361—18 **8 Claims**

1. A method of limiting overload in a power supply circuit of load to be protected, the method comprising the following operations:

inserting a switching regulator having a main electronic switch and an induction coil in series with said load;

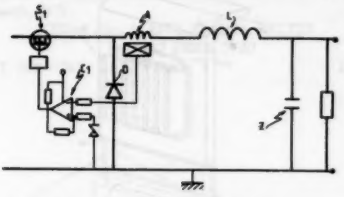
detecting the current flowing through said load by means of a current detector;

comparing the current detected in this way with a maximum current and with a minimum current by means of a main hysterosis comparator controlled by the current detector;

opening the main electronic switch in the power supply circuit of the load when the detected current reaches the maximum current fixed by the comparator, said switch being opened under the control of the main comparator;

diverting the electromagnetic energy stored in the induction coil to ground while the circuit is open; and

closing the main switch when the detected current reaches



the minimum current fixed by the main comparator, said switch being closed under the control of the comparator;

maintaining the induction coil short circuited for reducing the DC output impedance of the switching regulator, until a maximum value of the magnitude that is a function of the current flowing through the load is detected, the induction coil being inserted only until a minimum value of the said magnitude is detected.

5,161,083

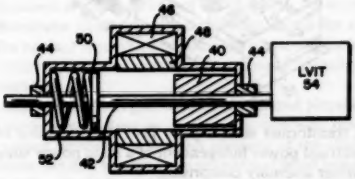
SOLENOID ACTUATOR WITH POSITION FEEDBACK SYSTEM

David B. Mohler, Tipp City, and Randy S. Robinson, Bradford, both of Ohio, assignors to Lucas Ledex Inc., Vandalia, Ohio

Filed Sep. 9, 1991, Ser. No. 756,537

Int. Cl.[5] H01H *47/22, 47/00*

U.S. Cl. 361—143 **8 Claims**



1. An independent solenoid actuator, said actuator comprising:

a stator including an energizing coil;

an armature;

means mounting said armature for movement between an energized coil position and a deenergized coil position;

means for urging said armature towards said deenergized position;

means for sensing actual position of said armature; and

means, responsive to said sensing means, for comparing said actual position with a desired position and for controlling energization of said coil to urge said armature towards said desired position.

5,161,084

APPARATUS FOR CONTROLLING AN OUTPUT OF CHARGERS FOR USE IN IMAGE FORMING APPARATUS

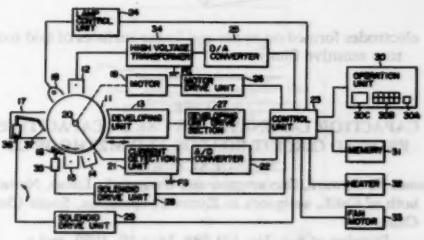
Kazushige Morihara, Kawasaki; Masashi Kimura, Yokohama, and Shin Yamauchi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 17, 1990, Ser. No. 466,586

Claims priority, application Japan, Mar. 23, 1989, 1-71445

Int. Cl.[5] G03G *15/00*

U.S. Cl. 361—225 **15 Claims**



1. An apparatus for controlling an output of chargers for use in an image forming apparatus, which apparatus comprises:

an image carrying member, said image carrying member being connected to a reference potential;

charging means for building up a charge on the image carrying member;

discharging means for removing the charge which has built up on the image carrying member;

means for designating an output control mode of the charging means;

current detecting means connected between the image carrying member and the reference potential so that, when the output control mode of the charging means is designated by the designating means, the current detecting means detects a signal in accordance with the charge flowing from the image carrying member to the potential upon the charging and discharging by the charging and discharging means, respectively; and

means for changing an output of the charging means so as to set the value of the detection output of the detecting means within an allowable range.

5,161,085

MOISTURE SENSITIVE ELEMENT AND METHOD OF MANUFACTURING THE SAME

Yoshirou Sakai; Yoshihiko Sadaoka; Masanobu Matsuguchi, all of Ehime; Takaaki Kuroiwa, and Tooru Abe, both of Kanagawa, all of Japan, assignors to Yamatake-Honeywell Co., Ltd., Tokyo, Japan

Filed Feb. 18, 1992, Ser. No. 837,059

Claims priority, application Japan, Feb. 21, 1991, 3-47452; Feb. 21, 1991, 3-47453

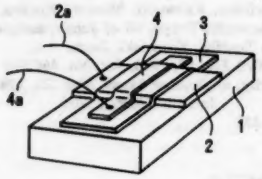
Int. Cl.[5] H01G *5/20*; G01N *25/64*

U.S. Cl. 361—286 **8 Claims**

1. A moisture sensitive element comprising:

a moisture sensitive film consisting of a polymer obtained by

polymerizing and crosslinking a fluorine-containing polyimide oligomer; and



electrodes formed on upper and lower surfaces of said moisture sensitive film.

5,161,086

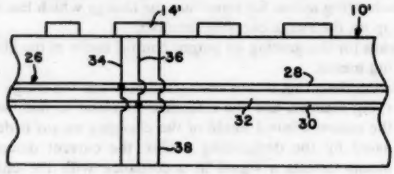
CAPACITOR LAMINATE FOR USE IN CAPACITIVE PRINTED CIRCUIT BOARDS AND METHODS OF MANUFACTURE

James R. Howard, Sacramento, and Gregory L. Lucas, Newark, both of Calif., assignors to Zycon Corporation, Santa Clara, Calif.

Division of Ser. No. 521,588, May 10, 1990, and a continuation-in-part of Ser. No. 397,518, Aug. 23, 1989, Pat. No. 5,079,069. This application Jan. 22, 1992, Ser. No. 823,865

Int. Cl.[5] H01G *4/10*; H05K *1/18*

U.S. Cl. 361—321 **18 Claims**



1. A capacitor laminate as an intermediate product for use within a laminated capacitive printed circuit board (PCB), comprising

two conductive foils and one sheet of dielectric material, the conductive foils and dielectric sheet having characteristics for producing desired capacitance in combination for large numbers of PCB devices, the conductive foils and dielectric sheet each being structurally rigid entities permitting their lamination together and having surface dimensions similar to at least a substantial portion of the PCB, the conductive foils and dielectric sheet being thin to form the capacitor laminate with a uniformly thin dimension suitable for inclusion as an internal layer of the PCB, the two conductive foils being laminated onto opposite sides of the dielectric sheet to form the capacitor laminate as a structurally rigid subassembly facilitating its lamination into the PCB.

5,161,087

PIVOTAL HEAT SINK ASSEMBLY

Jerome A. Frankeny, Taylor; Richard F. Frankeny, Austin; Karl Hermann, Austin, and Rolf Wustrau, Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 597,621, Oct. 15, 1990, abandoned. This application Aug. 7, 1991, Ser. No. 742,566

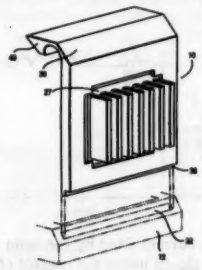
Int. Cl.[5] H05K *7/20*

U.S. Cl. 361—382 **15 Claims**

1. An apparatus for removing heat from a carrier having a plurality of heat sources attached thereto comprising:

a frame having means for releasably interconnecting to a carrier, said frame defining a frame window therethrough; and

heat transfer means disposed within said frame window for transferring heat through said frame window, wherein said heat transfer means further comprises:



a retainer plate assembly comprising a retainer plate which defines a plurality of retainer windows therethrough; and

a resilient heat transfer material attached to said retainer plate assembly.

5,161,088

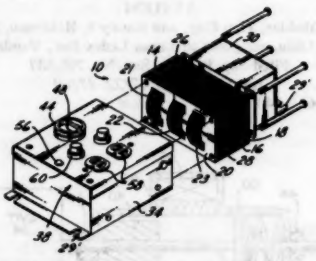
TRANSFORMER ASSEMBLY WITH EXPOSED HOLLOW HOUSINGS, AND MULTIPLE COILS

Peter H. Burgher, 15158 Wiles Dr., Captiva, Fla. 33924, and John Boomer, 424 Fowler St., Howell, Mich. 48843

Continuation-in-part of Ser. No. 540,198, Jun. 19, 1990, which is a continuation-in-part of Ser. No. 349,705, May 10, 1989. This application Mar. 18, 1991, Ser. No. 671,262

Int. Cl.[5] H05K *7/20*

U.S. Cl. 361—383 **23 Claims**



1. A transformer assembly for providing a source of auxiliary electrical power independent of a main power supply, the transformer assembly comprising:

a transformer having a core including a first side and a second side opposite thereto, and a plurality of coils, each coil including a first portion extending toward the first side of the core and a second portion extending toward the second side of the core, the core including exposed side and corner edges extending between the first and second sides thereof for facilitating the removal of heat generated by the transformer;

a first hollow housing coupled to the first side of the core for accommodating electrical components associated with the coils; and

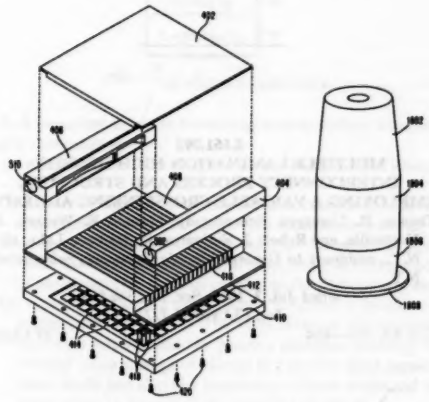
a second hollow housing coupled to the second side of the core for accommodating electrical components associated with the coils.

5,161,089

ENHANCED MULTICHIP MODULE COOLING WITH THERMALLY OPTIMIZED PISTONS AND CLOSELY COUPLED CONVECTIVE COOLING CHANNELS, AND METHODS OF MANUFACTURING THE SAME

Richard C. Chu; Michael J. Ellsworth, Jr., both of Poughkeepsie; Gary F. Goth, Pleasant Valley; Robert E. Simons, and Michael L. Zumbrunnen, both of Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 4, 1990, Ser. No. 532,722
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—385 14 Claims



1. An electronic circuit cooling module for cooling an array of integrated circuit chips mounted on a substrate, comprising:

a first section having a plurality of channels formed therein, the channels being disposed so as to create a multichannel flow path essentially parallel to the substrate when said module is assembled;

a first flow distributor connected to the first section and disposed at a first end of the channels, the first flow distributor comprising inlet means for supplying a coolant to a first plurality of the channels; and,

a second flow distributor connected to the first section and disposed at a second end of the channels, the second flow distributor comprising redistribution means for receiving the coolant from the first plurality of the channels and for redistributing the coolant to a second plurality of the channels,

wherein the coolant provided to the second plurality of the channels will flow in a direction opposite that of the coolant provided to the first plurality of the channels,

wherein the first section has a plurality of blind holes formed therein, the holes being disposed between the channels, and further comprising a plurality of pistons disposed at least partially in the holes; and,

wherein each of said pistons comprises:

a first cylindrical section;

a second tapered section disposed at a first end of the first section; and

a third tapered section disposed at a second end of the first section; and

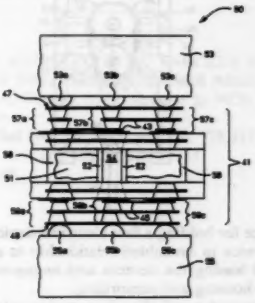
a chip contacting crown disposed on a free end of said third tapered section opposite said first cylindrical section, said crown having a radius of curvature approximating that of a surface of an integrated circuit chip with which the chip contacting crown is to make contact.

5,161,090

HEAT PIPE-ELECTRICAL INTERCONNECT INTEGRATION FOR CHIP MODULES

Robert K. Crawford, Palo Alto; Jacques Leibovitz, San Jose; Daniel J. Miller, San Francisco, Calif., and Kim H. Chen, Fremont, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 13, 1991, Ser. No. 806,997
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—385 18 Claims



11. An apparatus for controlling the temperature of one or more chips with electronic components thereon and for providing electrical interconnection between two or more such chips, the apparatus comprising:

a substrate having at least one channel completely contained therein, each said channel defining a hollow extending from a first end to a second end of the channel, the substrate having one or more faces with one or more chips positioned on at least one face over the first end of said channel;

a heat pipe wick, having a working fluid contained therein, completely situated within the hollow of the channel, extending from the first end of the channel toward the second end of the channel;

a heat pipe evaporator chamber in fluid communication with the wick at the first end of the channel, for receiving working fluid from the wick, adding thermal energy to the working fluid, and directing the working fluid to the second end of the channel;

a heat pipe condenser chamber in fluid communication with the wick at the second end of the channel, for receiving working fluid as a gas from the wick at a high temperature, withdrawing thermal energy from the working fluid, and returning the working fluid as a liquid within the wick to the first end of the channel;

heat dissipation means in thermal contact with the condenser chamber, for withdrawing thermal energy from the condenser chamber, dispersing or dissipating this thermal energy, and maintaining the temperature of the condenser chamber within a predetermined temperature range;

a plurality of columns of material of high electrical and thermal conductivity, each of said plurality of conducting columns being effective for direct thermal contact between at least one chip on a substrate face and the working fluid in the evaporator chamber; and

a plurality of electrical interconnect traces of material located on the substrate, each trace electrically connecting at least two distinct chips through at least two conducting columns,

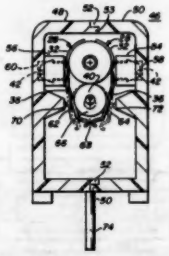
whereby a substantial portion of the heat generated by electronic components on said chips and said plurality of electrical interconnect traces of material is removed by said working fluid in said wick.

5,161,091

PACKAGING UNIT FOR AN ELECTRICAL ASSEMBLY

David Hohider, Wooster, and Mark A. Cenky, Lexington, both of Ohio, assignors to Therm-O-Disc, Incorporated, Mansfield, Ohio

Filed Dec. 20, 1991, Ser. No. 811,788
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—386 10 Claims



1. A device for holding a first electrical device and a second electrical device in assembled relationship to each other in a housing and biasing the devices into engagement with each other in the housing and comprising:

first and second metal clips in opposing relationship in the housing;

an arcuate end formed on each opposed metal clip such that opposing arcuate ends substantially encircle one-half of one of the electrical devices; and

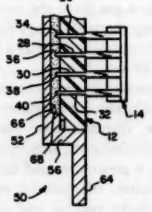
a resilient finger on the other end of each clip such that opposing resilient grasp the other electrical device and pull it into engagement with the first electrical device for heat transfer relationship, the resilient fingers deflecting to allow electrical devices of different diameters to be used in the housing.

5,161,092

CIRCUIT CARD ASSEMBLY CONDUCTION CONVERTER

William A. Smith, Laguna Hills, and Eugene L. Brodie, Anaheim, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 2, 1991, Ser. No. 724,695
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—387 5 Claims



1. An assembly for providing conductive cooling, said assembly including a circuit card which has been previously designed to be convectionally cooled, said circuit card being of the type having a first side upon which electronic components are mounted and a second side from which pins of said electronic components extend through corresponding openings in said circuit card and are soldered to solder pads on the second side of the circuit card, said assembly comprising:

a thermal mounting plate of high thermal conductivity material, said thermal mounting plate having a raised peripheral flat rim conforming to the outside border of said circuit card, said peripheral rim defining a pocket of said thermal mounting plate;

a layer of electrically nonconductive, thermally conductive elastomeric material filling said pocket of said thermal mounting plate up to said rim;

fastener means coupling the outside border of the second side of said circuit card against the perimeter flat rim of said thermal mounting plate, said perimeter rim being of a height above the surface of said mounting plate such that said pins extend into said layer of elastomeric material but do not extend to the surface of said thermal mounting plate; and

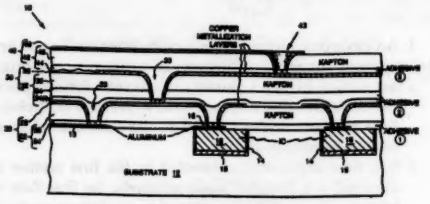
means coupling said mounting plate to a heat removal means.

5,161,093

MULTIPLE LAMINATION HIGH DENSITY INTERCONNECT PROCESS AND STRUCTURE EMPLOYING A VARIABLE CROSSLINKING ADHESIVE

Thomas B. Gorczyca, Schenectady; Stanton E. Weaver, Jr., Northville, and Robert J. Wojnarowski, Ballston Lake, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 2, 1990, Ser. No. 546,959
Int. Cl.[5] H05K 1/11
U.S. Cl. 361—414 19 Claims



1. A high density interconnect structure comprising:

a plurality of semiconductor chips each having contact pads on a first surface thereof;

a first layer of dielectric material bonded to said semiconductor chips, said first layer of dielectric material comprising first lower and first upper sublayers, said first lower sublayer being thermoplastic and having a first glass transition temperature T_{g1}, said first upper sublayer being stable over a range of temperatures above said first glass transition temperature, said first layer of dielectric material having via holes therein disposed in alignment with at least some of said contact pads;

a patterned first metallization layer disposed on said first layer of dielectric material and extending into contact with at least some of said contact pads in said via holes in said first layer of dielectric material; and

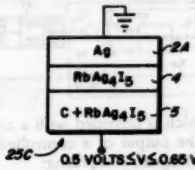
a second layer of dielectric material bonded to said first metallization layer and exposed portions of said first layer of dielectric material, said second layer of dielectric material comprising second lower and second upper sublayers, said second lower sublayer being a thermosetting polymer which can be cured at a temperature which is lower than T_{g1}, said second upper sublayer being stable over a range of temperatures above the minimum curing temperature of said thermosetting polymer.

5,161,094

SOLID ELECTROLYTE CAPACITOR AND METHOD OF MAKING

John F. Bruder, Phoenix, and Laurence N. Swink, Tempe, both of Ariz., assignors to Quadri Electronics Corporation, Chandler, Ariz.

Continuation-in-part of Ser. No. 562,234, Aug. 3, 1990, Pat. No. 5,047,899. This application Sep. 6, 1991, Ser. No. 756,315
Int. Cl.[5] H01G 9/00; H02J 7/04
U.S. Cl. 361—502 23 Claims



3. A capacitor structure for storing backup energy, comprising in combination:

(a) a layer of solid electrolyte material composed of $RbAg_4I_5$;

(b) a layer of negative electrode material composed of silver and adjoining a first surface of the electrolyte material;

(c) a layer of positive electrode material composed of activated carbon and $RbAg_4I_5$ and adjoining a second surface of the electrolyte material parallel to the first surface; and

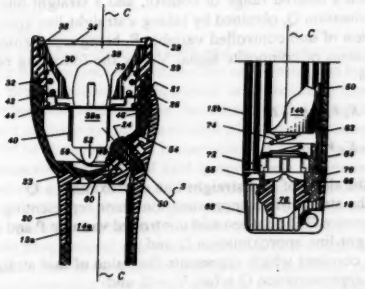
(d) means for charging the capacitor structure to produce a voltage of 0.50 volts to 0.66 volts between the negative electrode material and the positive electrode material, to thereby cause storage of charge in a double layer capacitance mode and also in a pseudocapacitance mode and to cause silver to deposit in the negative electrode.

5,161,095

FLASHLIGHT WITH SWIVEL HEAD AND ROTARY SWITCH

Richard J. Gammache, 1564 Mission Rd., Lancaster, Pa. 17601

Continuation-in-part of Ser. No. 565,506, Aug. 10, 1990, Pat. No. 5,043,854. This application Aug. 9, 1991, Ser. No. 742,872
Int. Cl.[5] F21L 7/00
U.S. Cl. 362—197 16 Claims



1. A flashlight comprising:

a casing containing a battery;

a head assembly mounted on an upper end of said casing and including a swivel head carrying a bulb, said swivel head being rotatable about a swivel axis which is inclined with respect to a longitudinal axis of said casing;

a tail assembly mounted on a lower end of said casing including rotary switch mans for illuminating and extinguishing said bulb, said tail assembly including a tail cap rotatably mounted on said lower end of said casing;

conductive means on said lower end of said casing;

a spring for electrically connecting said conductive means and a negative terminal on said battery in order to illuminate said bulb; and

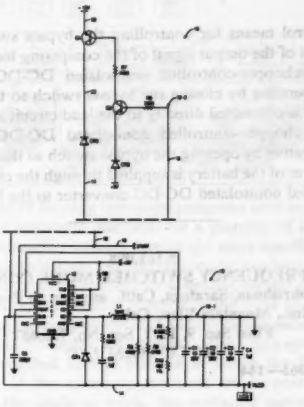
said rotary switch means including lifter means movable in response to rotation of said tail cap for lifting said spring out of contact with said conductive means thereby electrically disconnecting said conductive means and said battery negative terminal in order to extinguish said bulb.

5,161,096

METHOD AND CIRCUIT TO QUICKLY START A NEGATIVE SWITCHING VOLTAGE REGULATOR

Lee A. Newman, Dayton, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Oct. 16, 1991, Ser. No. 778,417
Int. Cl.[5] H02M 3/156
U.S. Cl. 363—49 12 Claims



1. A circuit comprising:

a source of negative voltage;

a switching regulator circuit having an output terminal and a chip having a start input thereto, with the voltage at said output terminal slowly increasing towards a regulated predetermined negative voltage when an energizing signal is placed on said start input; and

a start circuit coupled to said source of negative voltage, said output terminal, and said start input to couple the voltage from said source of negative voltage to said output terminal as soon as the energizing signal is placed on said start input and to uncouple said source of negative voltage from said output terminal when the voltage coming from the switching regulator circuit is greater than the voltage at the source of negative voltage but less than said predetermined voltage.

5,161,097

ELECTRIC POWER UNIT

Osamu Ikeda, Tokyo, Japan, assignor to Dia Semicon Systems Incorporated, Tokyo, Japan

Filed Mar. 20, 1992, Ser. No. 854,235
Claims priority, application Japan, Nov. 12, 1991, 3-322369
Int. Cl.[5] H02M 3/335
U.S. Cl. 363—124 4 Claims

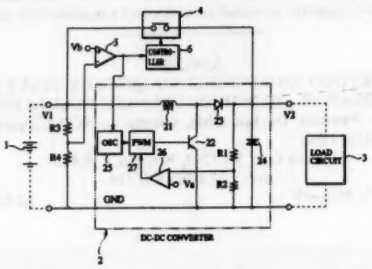
1. An electric power unit for supplying power to a battery-powered load circuit, comprising:

a chopper-controlled nonisolated DC-DC converter for

converting the output voltage of a battery into a required voltage;

a bypass switch for bypassing the chopper-controlled nonisolated DC-DC converter to connect the battery directly to the load circuit;

a comparing means for comparing the output voltage of the battery with a threshold voltage to see if the output voltage of the battery is higher than the threshold voltage; and



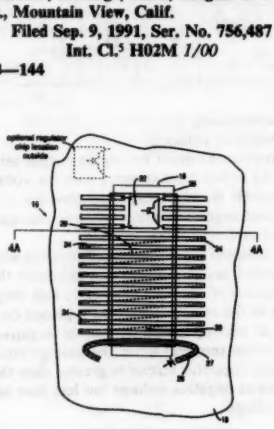
a control means for controlling the bypass switch on the basis of the output signal of the comparing means to hold the chopper-controlled nonisolated DC-DC converter inoperative by closing the bypass switch so that the battery is connected directly to the load circuit and to make the chopper-controlled nonisolated DC-DC converter operative by opening the bypass switch so that the output power of the battery is supplied through the chopper-controlled nonisolated DC-DC converter to the load circuit.

5,161,098

HIGH FREQUENCY SWITCHED MODE CONVERTER

Balu Balakrishnan, Saratoga, Calif., assignor to Power Integrations, Inc., Mountain View, Calif.

Filed Sep. 9, 1991, Ser. No. 756,487
Int. Cl.[5] H02M *1/00*
U.S. Cl. 363—144 **22 Claims**



1. An AC adaptor, comprising:

a U-core magnetic structure;

a leadframe which acts as a first portion of a primary winding of a transformer in magnetic proximity to the U-core magnetic structure, the leadframe encapsulated so as to form a standard DIP package;

a substrate having conductive traces which act as a second portion of primary winding; and

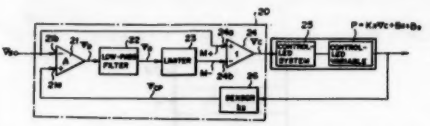
an I-core magnetic structure, said DIP package being mounted on said printed circuit board sandwiched between the I-core and U-core magnetic structures.

5,161,099

CONTROL METHOD AND CONTROLLER

Noboru Yamaguchi, 203 Isogo-Mansion, 11-15 Isogodai Isogo-ku, Yokohama-shi, Kanagawa-ken, Japan

Filed Sep. 22, 1989, Ser. No. 411,288
Claims priority, application Japan, Mar. 20, 1989, 1-68292
Int. Cl.[5] G05B *13/02*
U.S. Cl. 364—153 **6 Claims**



1. A controller which is provided with a control signal as input and controls the output of a controlled system in response to said control signal, comprising:

sensor means for monitoring a controlled variable which is controlled by said controlled system, and for providing as an output, a monitor signal which represents said controlled variable;

differential computing means, coupled to receive said monitor signal, for providing a differential signal representing the difference between said control signal and said monitor signal;

limiter means coupled to receive said differential signal, for clipping said differential signal to a specified upper limit value when said differential signal exceeds said upper limit value, and for clipping said differential signal to a specified lower limit value when said differential signal drops below said lower limit value, thereby providing, as an output, a clipped signal which is said differential signal clipped by said upper limit value and said lower limit value; and

signal synthesizer means, coupled to receive said control signal and said clipped signal, for synthesizing said control signal and said clipped signal in such a way that said monitor signal becomes negative feedback to said control signal, and providing a composite signal synthesized from said control signal and said clipped signal, thereby controlling the output of said controlled system based on said composite signal,

wherein said control signal is represented by V_S, said monitor signal by V_{CP}, said differential signal by V_D, and said composite signal by V_C, said controlled variable P, to within a desired range of control, and a straight-line approximation Q, obtained by taking a straight-line approximation of said controlled variable P, being represented as functions of composite signal V_C by the following equations

$$P=K_x V_c+B_x+B_o$$

$$Q=K_x V_c+B_o$$

wherein

K_x is the slope of said straight-line approximation Q

B_x is the straight-line approximation error representing the difference P-Q between said controlled variable P and said straight-line approximation Q and

B_o is a constant which represents the value of said straight-line approximation Q when $V_c=0$, and

wherein said sensor means operates according to a conversion coefficient k_s for converting said controlled variable P into said monitor signal V_{CP} by the equation

$$k_s=P/V_{cp}$$

the averaged value of the amplitude of variation of said slope K_x by K_o, a variable portion V of said control signal V_S provided by the equation

$$V_K = V_s - k_p B_o$$

the maximum value of the absolute value of said variable portion VK a this time by $V_{S\,MAX}$, an amplification factor A of said differential computing element is given by the equation

$$A = |V_D/(V_K - V_{Op})|$$

and a maximum value and a minimum value of said differential signal V_D defined by V_{DMAX} and V_{DMIN}, respectively, and wherein

said sensor means has a conversion coefficient k_S which satisfies the relation

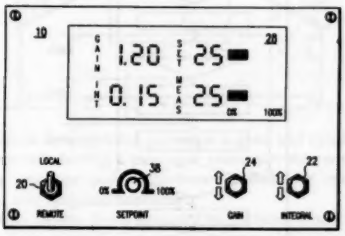
$$\frac{1}{K_o} \cdot \left(1 - \frac{V_{DMAX} - V_{DMIN}}{A \cdot |V_K|_{MAX}}\right) \leq k_s \leq \frac{1}{K_o} \cdot \left(1 + \frac{V_{DMAX} - V_{DMIN}}{A \cdot |V_K|_{MAX}}\right).$$

5,161,100

CLOSED LOOP PROPORTIONAL-INTEGRAL FLUID FLOW CONTROLLER AND METHOD

Richard B. Whipple, Tyler, Tex., assignor to Gas Services, Inc., Tyler, Tex.

Filed Feb. 26, 1990, Ser. No. 485,037
Int. Cl.[5] G05B *13/02*; G06F *3/00, 9/00*
U.S. Cl. 364—160 **26 Claims**



1. A system for controlling a flow of fluids through a pipe, comprising:

processor circuitry;

input circuitry associated with said processor circuitry having first and second switches for configuring the system in a predetermined configuration and providing operating parameters to the system, said first switch is operable in a first position to increase a value of an integral time parameter of the system and is operable in a second position to decrease said value of said integral time parameter, said second switch is operable in a first position to increase a value of a proportional gain parameter of the system and is operable in a second position to decrease said value of said proportional gain parameter, said first switch is operable to select among a plurality of configuration parameters when said first switch is in said first and second positions and said second switch is operable to raise a value of said selected parameter when said second switch is in said first position and lower said value of said selected parameter when said second switch is in said second position;

memory circuitry associated with said processor circuitry for storing said configuration and said operating parameters;

receiving circuitry associated with said processor circuitry for receiving input signals from external sensors coupled to said receiving circuitry; and

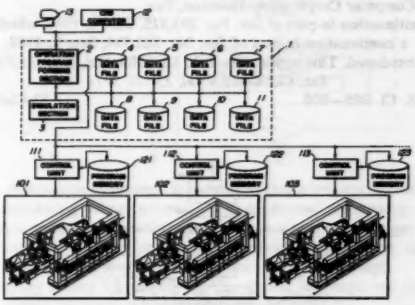
transmit circuitry responsive to said operating parameters and said input signals for transmitting output control signals to control the system.

5,161,101

METHOD OF FORMING AUTOMATIC MACHINE OPERATION PROGRAM

Tohru Nishiyama, Ayase, and Eiji Kikuchi, Zama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 25, 1990, Ser. No. 513,706
Claims priority, application Japan, Apr. 28, 1989, 1-107793; Apr. 28, 1989, 1-107794
Int. Cl.[5] G06F *15/46*; G05B *19/42*
U.S. Cl. 364—191 **8 Claims**



1. A method of forming operation programs used in operating respective automatic machines for a plurality of kinds of work, the automatic machines having the same specifications and individual variations, and each automatic machine including at least one function element for operating on said plurality of kinds of work, the method comprising the steps of:

(a) inputting normal position data and operation pattern data into a main computer, the normal position data specifying a predetermined normal position at which the function elements of the automatic machines are to operate for each of the kinds of work, the operation pattern data specifying a predetermined pattern of operation of the automatic machines for each of the kinds of work;

(b) measuring actual normal positions at which the function elements of respective automatic machines operate actually for each of the kinds of work;

(c) providing individual variation data specifying deviations of the measured actual normal positions from the respective predetermined normal positions for each of the kinds of work;

(d) inputting the individual variation data into the main computer;

(e) selecting one of the automatic machines;

(f) selecting one of the kinds of work;

(g) correcting the predetermined normal position data related to the selected automatic machine and the selected kind of work based on the individual variation data related to the selected automatic machine and the selected kind of work;

(h) inputting accomplished data obtained empirically for each of the kinds of work, the accomplished data specifying correction factors by which the respective predetermined normal positions should be shifted to provide an improved operation accuracy to the automatic machines;

(i) modifying the corrected normal position data based on the accomplished data;

(j) combining the modified normal position data with the operation pattern related to the selected automatic machine and the selected kind of work to form an operation

program required for the selected automatic machine to operate for the selected kind of work;

(k) repeating the above sequence of steps to form operation programs required for the selected automatic machine to operate for the other kinds of work;

(l) transferring the formed operation programs from the main computer into one of control units provided for controlling the selected automatic machine; and

(m) repeating the above sequence of steps (e) through (l) to form operation programs required for the other automatic machines for all of the kinds of work.

5,161,102

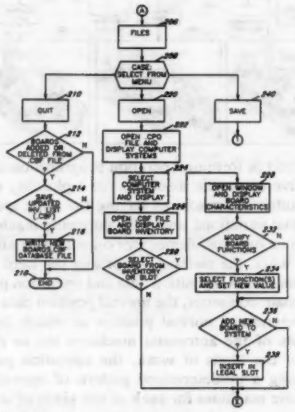
COMPUTER INTERFACE FOR THE CONFIGURATION OF COMPUTER SYSTEM AND CIRCUIT BOARDS

Michael R. Griffin; Daryl D. George, both of Houston, and Curtis R. Jones, Jr., Cypress, all of Tex., assignors to Compaq Computer Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 293,315, Jan. 4, 1989, which is a continuation-in-part of Ser. No. 242,734, Sep. 9, 1988, abandoned. This application Feb. 13, 1989, Ser. No. 311,021

Int. Cl.[5] G06F *9/00, 13/00, 3/14*

U.S. Cl. 395—800 **13 Claims**


FILES
CASE: SELECT FROM MENU
QUIT
OPEN
SAVE
BOARD(S) ADDED OR DELETED FROM CRF FILE?
OPEN CRG FILE AND DISPLAY COMPUTER SYSTEMS
SAVE UPDATED INVENTORY FILE (.CRF)?
SELECT COMPUTER SYSTEM AND DISPLAY
WRITE NEW BOARDS TO DATABASE FILE
OPEN CRF FILE AND DISPLAY BOARD INVENTORY
END
SELECT BOARD(S) FROM INVENTORY FOR SLOT
MODIFY BOARD FUNCTIONS
OPEN WINDOW AND DISPLAY BOARD CHARACTERISTICS
SELECT FUNCTION(S) AND SET NEW VALUE
ADD NEW BOARD TO SYSTEM
INSERT IN LEGAL SLOT

1. For use with a computer system and a operator, an interactive display method for controlling the configuration of a plurality computer systems and circuit boards, the computer systems providing for interchangeable circuit boards to be inserted in a plurality of system slot locations, the circuit boards having a plurality of selectable operational functions, the circuit boards further having a plurality of hardware and software settings which permit the circuit boards to be configured to utilize one or more common computer resources, the steps comprising:

the computer accessing and displaying stored descriptions of a plurality of circuit boards;

the operator selecting circuit boards to be configured with said selected computer system from said displayed list of circuit boards;

the computer assigning each of said selected circuit boards to a slot in said selected system;

the computer displaying available operational functions for said circuit boards;

the operator selecting operational functions to be activated for said selected circuit boards;

the operator invoking a configuration utility to allocate common computer resources to said selected circuit boards; and

the computer displaying the results of said configuration allocation;

the computer displaying the required settings for said circuit boards based on said configuration allocation; and

the computer storing said configuration allocation for said selected circuit boards and computer system.

5,161,103

REAL TIME STATUS MONITORING SYSTEM

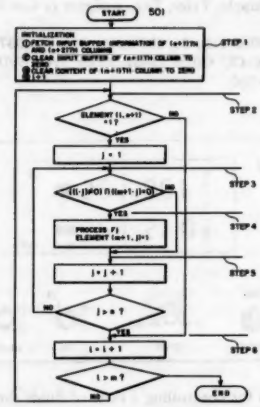
Michitaka Kosaka, Sagamihara; Toshiro Sasaki, Tokyo; Kuniaki Matsumoto, Tokyo; Kichizo Akashi, Ebina, and Satoru Suemitsu, Kawasaki, all of Japan, assignors to Hitachi, Ltd, Tokyo, Japan

Filed Jul. 5, 1989, Ser. No. 376,122

Claims priority, application Japan, Jul. 8, 1988, 63-168702

Int. Cl.[5] G06F *15/00*

U.S. Cl. 364—408 **11 Claims**



1. A real time status monitoring method, the method comprising the steps of:

inputting randomly varying data relating to a plurality of types of objects;

preparing a real time status management table indicating which ones of the data are used as variables by a plurality of functions;

generating data change flags indicating which of the ones have been inputted by detecting reception of the data;

determining the variables which are subjects of processing due to the data reception and types of the functions which include the variables based on the data change flags and a function processing and flag indicating that the processing of the functions has been completed;

processing only those functions which include the variables which are subjects of processing due to the data reception, based on a result of the determining;

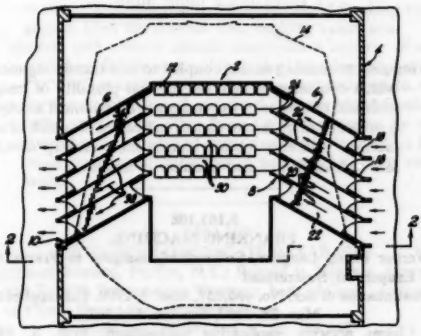
generating the function processing end flag indicating that the processing of the functions has been completed for the ones of the data, based on the processing of the functions; and

displaying the processing result of the functions.

5,161,104
AMUSEMENT RIDE HAVING PIVOTABLE INGRESS-EGRESS BRIDGES

Richard J. Fox, La Canada; Maurice G. Leasure, Sun Valley; Gregory S. Kadorian, Simi Valley; Douglas R. LeBlanc, Tujunga; David L. Harbaugh, La Mirada; James E. Poole, Topanga, all of Calif., and Donald A. Hoffend, Jr., Pittsford, N.Y., assignors to The Walt Disney Company, Burbank, Calif.

Continuation of Ser. No. 141,933, Jan. 11, 1988, Pat. No. 5,021,954. This application Jun. 3, 1991, Ser. No. 710,518
Int. Cl.[5] G06F 15/28
U.S. Cl. 364—410 17 Claims



1. A system for providing passenger ingress and egress in an amusement ride having a passenger cabin movable within an operating envelope and an enclosure outside the operating envelope, said system comprising:

a plurality of first doors arranged on surfaces of said cabin, said doors providing access to ingress and egress paths within said cabin;

a plurality of second doors arranged on surfaces of said enclosure, said second doors being substantially in alignment with said first doors when said cabin is in a loading position;

a substantially horizontal ledge within said enclosure having one end connected to said enclosure under said second doors and a free end located outside the operating envelope of said cabin;

a bridge pivotally connected to the free end of said ledge for pivoting motion between a retracted position, in which said bridge is pivotally retracted against said enclosure and above said ledge outside the operating envelope of said cabin, and a deployed position, in which said bridge is pivoted away from said enclosure to provide access from said ledge to said cabin through said first and second doors when said cabin is in said loading position;

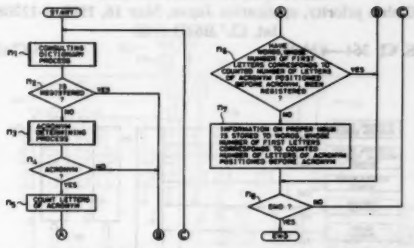
pivoting means for pivoting said bridge between said retracted and said deployed positions; and

control means for controlling and coordinating the opening of said first doors and said second doors and the pivoting of said platforms so as to enable rapid passenger ingress and egress to and from said cabin when said cabin is in said loading position.

5,161,105
MACHINE TRANSLATION APPARATUS HAVING A PROCESS FUNCTION FOR PROPER NOUNS WITH ACRONYMS

Shuzo Kugimiya, Nara; Yoji Fukumochi, Ikoma; Ichiko Sata, Nara; Tokyuki Hirai, Yamatokoriyama, and Hitoshi Suzuki, Nara, all of Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Jun. 27, 1990, Ser. No. 544,329
Claims priority, application Japan, Jun. 30, 1989, 1-170301
Int. Cl.[5] G06F 15/38
U.S. Cl. 364—419 5 Claims



1. A machine translation apparatus having a process function for translating proper nouns used as acronyms, comprising:

input means for entering a sentence in a source language;

dictionary means for storing dictionary information for translating a source language into a target language;

display means for displaying the source language and the target language which has been translated;

source language analysis means for obtaining, on the basis of information obtained by consulting the dictionary information of said dictionary means, a morphology element string for the individual words in the sentence entered in the source language by said input means;

sentence construction analysis means for analyzing, by using said dictionary information obtained by consulting the dictionary, the sentence construction of the morphology element string which is obtained by said source language analysis means;

converting means for converting, based on said dictionary information obtained by consulting the dictionary, a sentence construction obtained by said sentence construction analysis means into a sentence construction in the target language;

translation text generating means for translating, based upon the structure of the sentence construction in the target language which is obtrained by said converting means and based upon said dictionary information obtained by consulting the dictionary, the individual words of a sentence entered in the source language into a sentence in the target language;

determining means for determining, as a result of consulting the dictionary by said source language analysis means, whether or not an individual word in said source language sentence is a proper noun used as an acronym;

examining means for examining, when said word is determined to be a proper noun used as an acronym, whether or not said target language sentence contains a selected group of words having a number of capital letters which corresponds to the number of letters in the acronym, said selected group of words being positioned on one side of the acronym, and for examining whether or not the selected group of words are registered as compound words in said dictionary means; and

acronym processing means for translating the selected groups of words into a sentence in the target language when the selected group of words are registered as compound words in said dictionary means, and for directly

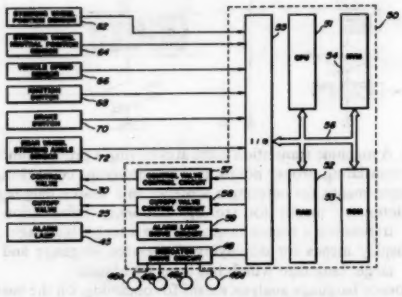
outputting the words, whose number of capital letters corresponds to the number of letters in the acronym, onto said display means without being translated when the selected group of words are not registered as compound words in the dictionary.

5,161,106

VEHICLE DYNAMIC CHARACTERISTIC CONTROL APPARATUS

Yasuhiro Shiraishi, Atsugi, and Yasuki Ishikawa, Sagamihara, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 3, 1990, Ser. No. 519,225
Claims priority, application Japan, May 16, 1989, 1-122060
Int. Cl.[5] B62D *5/00*
U.S. Cl. 364—424.05 **3 Claims**



1. A vehicle dynamic characteristic control apparatus for use with a motor vehicle having a controllable dynamic characteristic, comprising:

sensor means sensitive to vehicle running conditions for producing sensor signals indicative of sensed vehicle running conditions;

actuator means for controlling the dynamic characteristic of the motor vehicle; and

a control unit coupled between the sensor means and the actuator means, the control unit including means for determining a value for a first setting of the actuator means based on the sensor signals, means for converting the determined value into a second setting of the actuator means, means for producing a start command when braking is applied to said motor vehicle intermittently a predetermined number of times or more in a predetermined period of time, means responsive to the start command for producing an electric signal to operate the actuator means in a self-checking mode, means for producing a termination command when a time has elapsed after the start command is produced, and means responsive to the termination command for terminating the self-checking mode of operation of the actuator means.

5,161,107

TRAFFIC SURVEILLANCE SYSTEM

Paul H. Mayeaux, and Virgil O. Stamps, both of Houston, Tex., assignors to Mestech Creation Corporation, Houston, Tex.

Filed Oct. 25, 1990, Ser. No. 603,179
Int. Cl.[5] G06F *15/70*
U.S. Cl. 364—436 **31 Claims**

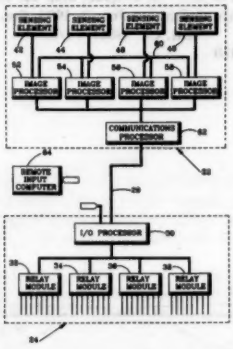
24. A machine vision system for detecting and recognizing objects, comprising:

means for receiving electromagnetic wavelengths of varying frequencies from the object;

a plurality of filters receiving said electromagnetic wavelengths from said receiving means and each passing a portion of said electromagnetic wavelengths as a function of the frequency of the electromagnetic spectrum;

means for translating portions of said electromagnetic wavelengths into a corresponding plurality of images;

storing means for storing multiple reference object images; and



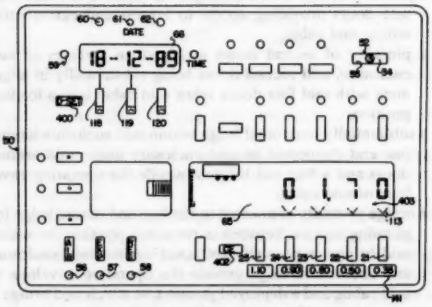
imaging processing means coupled to said translating means which compares at least one of said plurality of images with said reference object images to determine if an object is present and generates signals indicative of which of said multiple reference object images most closely matches said at least one of said plurality of images.

5,161,108

FRANKING MACHINE

Werner Haug, Langnau, Switzerland, assignor to Frama AG, Lauperswil, Switzerland

Continuation of Ser. No. 490,037, Mar. 7, 1990. This application Mar. 23, 1992, Ser. No. 856,302
Claims priority, application Switzerland, Mar. 8, 1989, 00854/89
Int. Cl.[5] G07B *17/00*
U.S. Cl. 364—464.02 **7 Claims**



1. A franking machine comprising:

a printing head fixed to a machine mainshaft;

a drive for said machine mainshaft in order to rotate said printing head for at least one printing cycle;

typewheels mounted in rotary manner in said printing head for printing a franking value;

an electromechanical drive including control members for said typewheels for setting a desired franking value;

mechanical locking means for securing the set positions of said control members of said electromechanical drive;

a central electronic control unit including a memory in which is stored a postal rate table, and a program memory for automatically controlling the timing and operating functions of said electromechanical drive;

sensors for supplying position signals of said locking means to said central electronic control unit for the control of said electromechanical drive;

a control console comprising a keyboard, having an instruction key and a plurality of franking value entry keys, for the random inputting of instructions to said control unit for setting said typewheels of said printing head, and at least one display panel for the display of the inputted instructions; and

wherein said central electronic control unit comprises:

means responsive to actuation of said franking value entry keys to provide a total franking value to be operatively coupled to said print head via said electromechanical drive;

means responsive to actuation of said instruction key for programming at least one of said entry keys, such that after programming, and upon actuation of, said one entry key, a programmed predetermined franking value amount is provided; and

means responsive to further actuation of said one entry key to cancel said programmed predetermined franking value amount from the entered total franking value; and

wherein said control console comprises a number of said entry keys for the entry of individual franking value digits ("0"–"9") at each decimal place in a first entry mode, and for the direct entry of said fixed predetermined franking value amounts resulting from the programming by said control unit in a second entry mode, said instruction key being operative for switching between said two entry modes.

5,161,109

UP/DOWN LOADING OF DATABASES

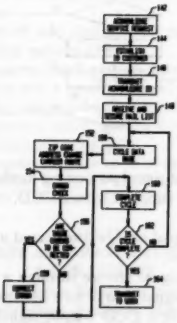
Raymond Keating, Purdys, N.Y.; Ronald P. Sansone, Weston, and Karl H. Schumacher, Westport, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 16, 1988, Ser. No. 285,145

The portion of the term of this patent subsequent to Dec. 31, 2008, has been disclaimed.

Int. Cl.[5] G07B *17/02*

U.S. Cl. 364—464.02 **7 Claims**



3. A communication system for expanding user facility capability for processing information relating to distribution of mail, comprising: a central data station having a standard database, means for receiving from a plurality of user stations user database information relating to distribution of mail items, means for modifying said standard database located at said central station, and means for modifying said user databases to conform to said modified standard database, whereby said user stations can distribute said mail items in accordance with their said modified databases.

5,161,110

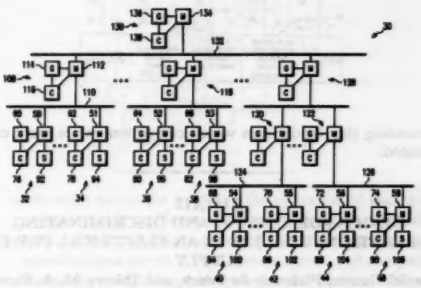
HIERARCHICAL PROCESS CONTROL SYSTEM AND METHOD

Wayne A. Dorchak, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Feb. 27, 1990, Ser. No. 485,425

Int. Cl.[5] G06F *15/46*

U.S. Cl. 364—468 **34 Claims**



1. A real-time hierarchical process control system comprising:

a monitor for receiving and monitoring a plurality of input signals, said monitor producing a first request if at least one input signal exceeds a predetermined range;

a guardian for receiving said request and determining a course of action, said guardian producing a second request; and

a consultant for receiving said second request, performing an analysis and producing information for aiding said determination of a course of action.

5,161,111

METHOD AND APPARATUS FOR REGULATING QUALITY PARAMETERS IN A YARN PRODUCTION LINE

Reinhard Oehler, Berg am Irchel; Urs Meyer, Niederglatt, and Jurg Bischofberger, Raterschen, all of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Jul. 26, 1990, Ser. No. 558,617

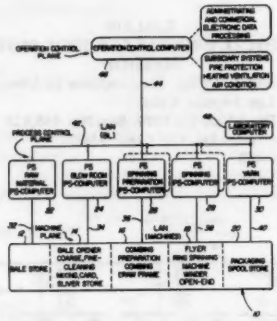
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1989, 3924779

Int. Cl.[5] G06F *15/46*

U.S. Cl. 364—470 **29 Claims**

1. A method of operating a production line of a spinning mill comprising selected fiber material processing regions, the regions comprising a blow room region, a spinning preparation region and a spinning region, each region comprising a plurality of textile machines each performing fiber processing steps and operating in series or in parallel to form a machine plane, the individual series connected textile machines producing different fiber structures, wherein raw fiber material which enters into the blow room is processed into spun yarn at the output of the spinning mill, the method comprising measuring at least one selected quality feature of the fiber structure produced by one or more of the textile machines in each of the selected regions, regulating at least one of the respective textile machine or an earlier textile machine of the same region on the basis of the measured quality feature, calculating correction values from at least one of the quality features measured in one

or more of the spinning preparation and spinning regions, and using the correction values to modify the operation of a region



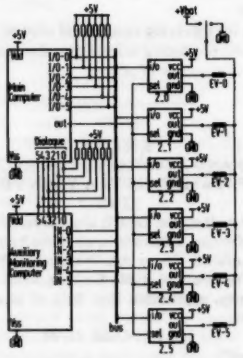
preceding the region from which correction values were calculated.

5,161,112

DEVICE FOR SENSING AND DISCRIMINATING OPERATIONAL FAULTS IN AN ELECTRICAL POWER SUPPLY

Daniel Guerra, Plaisance du Touch, and Thierry M. A. Sicard, Fenouillet, both of France, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 11, 1990, Ser. No. 580,606
Claims priority, application France, Sep. 11, 1989, 89 11819
Int. Cl.[5] G06F *15/56*
U.S. Cl. 364—483 **14 Claims**



1. A device for controlling an electronic switch and detecting and discriminating between operating faults in at least one electrical power supply circuit for a load connected in series with the electronic switch, said device comprising:

a bidirectional input/output control line for carrying control signals and first interrogation signals in one direction and interogation result signals in the opposite direction;

a selection line for carrying second interrogation signals in said one direction; a computer connected to said bidirectional input/output control line and to said selection line and programmed to place control signal combinations on said input/output and selection lines in an interrogation mode and to accept logic status signals as interrogation result signals from said input/output line in a read mode;

detection means connected to the power supply circuit of the load for detecting at least one operating fault selected from the group consisting of a short-circuit condition of the load, permanent control of the load and an open-circuit condition of the load;

said detection means comprising at least one detector including an input and an output, said input connected to a predetermined point of the power supply circuit of the load and sensitive to an electrical characteristic of said predetermined point to form a logic signal at said output representative of the value of said electrical characteristic with respect to a predetermined value, a logic circuit including a first input connected to said output of said at least one detector, a second input connected to said selection line and a third input connected to said input/output control line, and an output, said logic circuit actuated in response to at least one combination of control signals emitted by said computer to detect presence of a predetermined fault as indicated by said at least one detector and to produce at said output thereof a signal representative of the detected presence or absence, and a logic signal imposition means including an input and an output, said input connected to said output of said logic circuit to cause said logic signal imposition means to place a corresponding one of two logic levels respectively representing the presence or absence of the predetermined fault on said output connected to said input/output control line; and

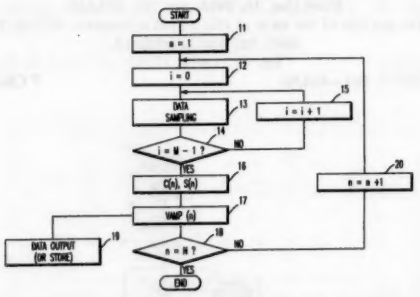
said computer comprising fault identification means connected to said input/output control line for reading and identifying the status of the power supply circuit with respect to the interrogated logic circuit.

5,161,113

CCD OUTPUT SIGNAL PROCESSING METHOD AND APPARATUS

Katsuyuki Omura, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 11, 1990, Ser. No. 551,005
Claims priority, application Japan, Jul. 13, 1989, 1-181258
Int. Cl.[5] G06F *15/20*; H03B *1/04*
U.S. Cl. 364—486 **10 Claims**



1. A CCD output signal processing method for processing a CCD output signal supplied from a CCD, comprising the steps of:

a) detecting a signal charge transferred in synchronism with a transfer clock;

b) passing said signal charge through a detection diode to convert said signal charge to a detection voltage;

c) producing a first CCD output signal having a random noise component;

d) sampling said first CCD output signal supplied from the CCD in synchronism with the transfer clock to thereby generate a plurality of sampled CCD output data pieces within an n-th section corresponding to one pixel (n is an arbitrary integer);

e) expanding said sampled CCD output data pieces to a Fourier series, wherein the Fourier series has a basic

waveform having a period substantially corresponding to a reciprocal of a frequency of said transfer clock;

f) calculating an amplitude of said basic waveform from first-order Fourier coefficients included in said Fourier series, said amplitude of said basic waveform being a corrected amplitude of said first CCD output signal supplied from the CCD; and

g) producing a second CCD output signal, reconstructed from said amplitude of said basic waveform, having said random noise component eliminated.

5,161,114

METHOD OF MANUFACTURING A RETICULE

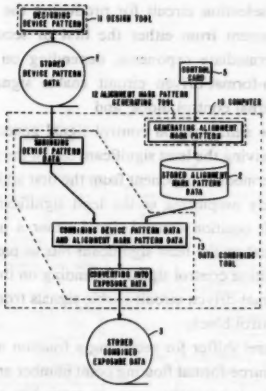
Shin Akiyama, Kasugai, Japan, assignor to Fujitsu Limited, Kawasaki and Fujitsu VLSI Limited, Kasugai, both of, Japan

Filed Mar. 13, 1990, Ser. No. 492,134

Claims priority, application Japan, Mar. 15, 1989, 1-062830

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—490 **4 Claims**



1. A method of manufacturing a reticule employed in manufacturing a semiconductor device using a computer, comprising the steps of:

generating first device pattern data;

storing said first pattern data in first data storing means;

reading said first device pattern data stored in said first data storing means;

shrinking a size of said first device pattern data so as to generate second pattern data;

generating alignment mark pattern data which has a predetermined shape and a predetermined size;

combining in the computer said second device pattern data and said alignment mark pattern data so as to produce combined pattern data; and

operating an exposure apparatus to be employed in manufacturing the reticule based on said combined pattern data.

5,161,115

SYSTEM TEST APPARATUS FOR VERIFYING OPERABILITY

Fumiaki Teshima, Otawara; Katsuhiro Inoue; Kaoru Kurebayashi, both of Yokohama; Yukihiro Mihara, Kawasaki, and Takuya Kishimoto, Kamakura, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jun. 26, 1990, Ser. No. 543,371

Claims priority, application Japan, Sep. 12, 1989, 1-236403; Sep. 12, 1989, 1-236409; Dec. 22, 1989, 1-333556

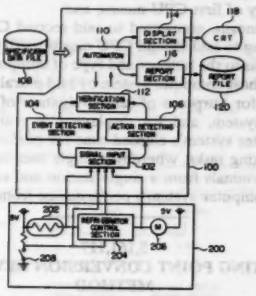
Int. Cl.[5] G06F *15/46*

U.S. Cl. 364—551.01 **6 Claims**

1. In a system test apparatus for verifying whether a tested system operates according to specifications including event information and action information, the improvement comprising:

storage means for storing the specifications as a finite state machine model including allowable errors associated with the event and action information;

detection means for detecting operation information of the tested system as events and actions;



verification means for verifying the operation of said tested system, said verification means including controlling means for controlling said tested system according to the specifications stored in said storage means and comparing means for comparing said operation information with said specifications stored in said storage means to determine whether the detected operation information occurs within the allowable errors associated with the event and action information.

5,161,116

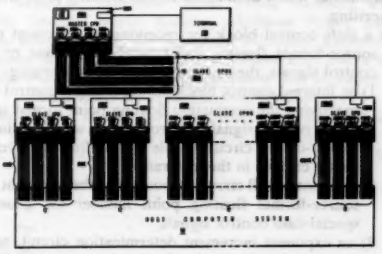
SYSTEM FOR EVALUATING THE PERFORMANCE OF A LARGE SCALE PROGRAMMABLE MACHINE CAPABLE OF HAVING A PLURALITY OF TERMINALS ATTACHED THERETO

J. Wayne Schneider; K. Brook Richan, both of Provo, and Richard K. Wilson, Orem, all of Utah, assignors to Dynix, Provo, Utah

Filed Feb. 27, 1989, Ser. No. 316,375

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—551.01 **10 Claims**



1. A robot system for evaluating the performance of a host computer system having a plurality of host communication ports connectable to a plurality of user terminals prior to placing said host computer system into service with said user terminals, said robot system emulating said plurality of user terminals and emulating predefined computing tasks input to the host computer system from the user terminals, and said robot system comprising:

a plurality of first CPU means, each connected to a plurality of said host communication ports whereby each first CPU

means emulates a plurality of user terminals, for inputting said computing tasks to said host computer system;

a second CPU means, connected to each said first CPU means, for coordinating and communicating to said plurality of first CPU means said computing tasks input at each said host communication port to said host computer system from said plurality of first CPU means and for monitoring and recording the host computer system's elapsed time for performing each computering task input from the plurality of first CPU means; and

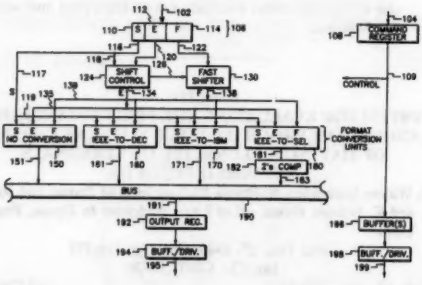
terminal means, connected to said second CPU means, for inputting to said second CPU means predefined user commands as to the number and type of computing tasks input to said host computer system by said plurality of first CPU means for purposes of said evaluation of the host computer system, and for displaying in real time the host computer system's elapsed time for performing the input computing tasks, whereby a single user can emulate said user terminals from a single station and can evaluate the host computer system's performance from that station.

5,161,117

FLOATING POINT CONVERSION DEVICE AND METHOD

William N. Waggener, Jr., Sarasota, Fla., assignor to Fairchild Weston Systems, Inc., Sarasota, Fla.

Filed Jun. 5, 1989, Ser. No. 361,588
Int. Cl.[5] G06F 7/00
U.S. Cl. 364—715.03 **24 Claims**



1. An apparatus for converting a source-format floating point number into a destination-format floating point number, comprising:

a) a shift control block for receiving an exponent of the source-format floating point number and one or more control signals, the shift control block comprising:

1) an internal control block for receiving a control signal specifying the destination floating point format specification control signal and producing a set of destination-format-driven circuit enable signals for selectively enabling circuits in the apparatus;

2) an exponent fill circuit responsive to the exponent of the source-format floating point number for generating special-case control signals;

3) an exponent increment determination circuit, responsive to the destination-format-driven circuit enable signals from the internal control block, for generating a first exponent increment number and possibly also a second exponent increment number;

4) an exponent addition circuit responsive to the exponent of the source-format floating point number, the special-case control signals, and the exponent increment number(s), for producing a shift position control signal and an intermediate exponent, the exponent addition circuit comprising

i) a first adder for receiving the first exponent increment number and generating a first potential intermediate exponent,

A) the least significant bits of which are input to a shift position control signal generation circuit so as to selectively generate the least significant bits of the shift position control signal, and

B) the most significant bits of which are input to a second adder; and

ii) the second adder, receiving the most significant bits of the first potential intermediate exponent output from the first adder, also receiving at the same input at least one of the special case control signals from the exponent fill block, the second adder receiving the second exponent increment number from the exponent increment determination circuit, the second adder outputting a second potential intermediate exponent; and

iii) a selection circuit for producing the intermediate exponent from either the first or second potential intermediate exponents, depending on the destination-format-driven circuit enable signals from the internal control block; and

iv) the shift position control signal generation circuit, receiving the least significant bits of the first potential intermediate exponent from the first adder, and selectively outputting as the least significant bits of the shift position control signal either a predetermined signal or the least significant bits as part of the shift position control signal, depending on the destination-format-driven circuit enable signals from the internal control block;

b) a barrel shifter for receiving a fraction or mantissa of the source-format floating point number and shifting the fraction or mantissa zero or more bits in accordance with the shift position control signal from the shift control block, so as to produce an intermediate fraction or mantissa;

c) one or more format conversion units for receiving the intermediate exponent and the intermediate fraction or mantissa, for formatting the intermediate fraction or mantissa and the intermediate exponent into the destination-format floating point number, the format conversion units comprising

1) a programmable logic array for routing the bits of the fraction or mantissa and exponent to proper bit positions in the destination-format floating point number; or

2) a buffer for receiving the intermediate exponent and fraction or mantissa when the source format and the destination format are identical; and

d) a selection circuit for selecting the output from the format conversion unit producing the destination-format floating point number when more than one format conversion unit is present, the selection circuit comprising tri-state buffers or selectors responsive to the outputs of the format conversion units and to the destination-format-driven circuit enable signals from the internal control block in the shift control block, for arbitrating which format conversion unit produces the destination-format floating point number which is output from the apparatus.

5,161,118

HAND HELD DATA PROCESSING APPARATUS

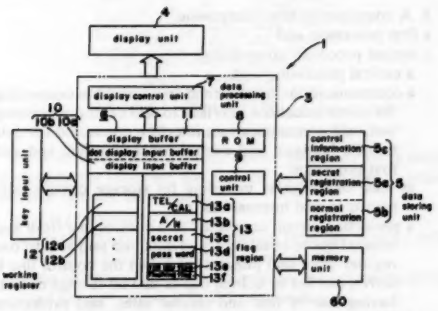
Eichika Matsuda, Yamatotakada; Kaoru Murata, and Yoshihiro Okuda, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 472,448, Jan. 29, 1990, which is a continuation of Ser. No. 108,210, Oct. 14, 1987, abandoned. This application Mar. 26, 1991, Ser. No. 675,268

Claims priority, application Japan, Oct. 14, 1986, 61-243702; Oct. 14, 1986, 61-243703; Oct. 14, 1986, 61-243704; Oct. 14, 1986, 61-243705; Oct. 14, 1986, 61-243706; Oct. 14, 1986, 61-243707; Oct. 14, 1986, 61-243708; Oct. 14, 1986, 61-243709; Oct. 14, 1986, 61-243710; Oct. 14, 1986, 61-243711; Oct. 14, 1986, 61-243712; Oct. 14, 1986, 61-243713; Oct. 21, 1986, 61-251477

Int. Cl.[5] G06F *7/38*

U.S. Cl. 364—744 10 Claims



1. A portable data processing device, comprising:

input means for inputting numeric and alphabetic data, wherein said input means further comprises a plurality of alphanumeric keys for manually inputting numeric and alphabetic data and a decimal point key for inputting decimal point data associated with said numeric data;

a mode key for changing operation of the processing device;

a reading key, separate from a mode key, for selectively reading out either numerical or alphabetic data;

memory means for storing said numeric and alphabetic data inputted through said input means;

data processing means for performing numerical calculations and processing alphabetic data, said data processing means including a calculation mode for performing calculations and memorandum pad mode for storing data in said memory means for reading data stored in said memory means;

actuation means separate from a mode key for selectively changing said data processing means from said calculation mode to said memorandum pad mode upon direct actuation of said reading key means;

display means for displaying said alphabetic and numeric data stored in said memory means, wherein said display means further comprises decimal point display means responsive to said decimal point key for displaying decimal point data associated with said numeric data;

means for displaying a cursor; and

means for displaying a decimal point at the left side of the cursor when a decimal point is inputted.

5,161,119

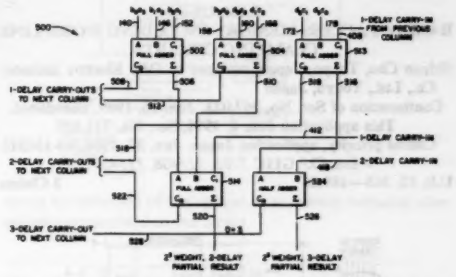
WEIGHTED-DELAY COLUMN ADDER AND METHOD OF ORGANIZING SAME

Yen C. Chang, Saratoga, and Jeffrey A. Werner, Santa Clara, both of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.

Filed Feb. 14, 1990, Ser. No. 479,933

Int. Cl.[5] G06F *7/50*

U.S. Cl. 364—786 13 Claims


1-DELAY CARRY-IN FROM PREVIOUS COLUMN
1-DELAY CARRY-OUTS TO NEXT COLUMN
1-DELAY CARRY-IN
2-DELAY CARRY-OUTS TO NEXT COLUMN
2-DELAY CARRY-IN
3-DELAY CARRY-OUT TO NEXT COLUMN
2⁰ WEIGHT, 2-DELAY PARTIAL RESULT
2¹ WEIGHT, 2-DELAY PARTIAL RESULT

1. A method of adding two or more binary numbers, comprising:

organizing binary numbers into columns of input bits according to the binary-weight of the individual input bits;

arranging a plurality of adders in chains, each adder chain having a binary significance associated therewith and representing a column for adding input bits of a particular binary-weight;

determining propagation delays for each adder output intermediate sum in each adder chain;

applying the input bits to the adder chains for addition to adders in the chain which have the shortest possible propagation delays associated therewith; and

applying carry-outs from an adder chain of a given binary significance "n" as carry-ins to an adder in the next more significant "n+1" adder chain which is adding intermediate sums of n+1 weight having propagation delays most nearly matching the propagation delay of the carry-ins.

5,161,120

DATA OUTPUT BUFFER FOR A SEMICONDUCTOR MEMORY

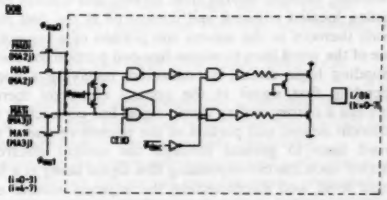
Takeshi Kajimoto, Hamura; Yutaka Shimbo, Hino; Katsuyuki Sato, Akishima; Masahiro Ogata, Fussa; Kanehide Kenmizaki, Kodaira; Shouji Kubono, Akishima; Nobuo Kato, Ohme; Kiichi Manita, Kawagoe, and Michitaro Kanamitsu, Akishima, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi VLSI Engineering Corp., Kodaira, both of, Japan

Filed Mar. 20, 1990, Ser. No. 496,531

Claims priority, application Japan, Mar. 20, 1989, 1-65842

Int. Cl.[5] G11C *7/00*

U.S. Cl. 365—189.05 15 Claims



1. An output buffer comprising: a latch for receiving complementary internal output signals; a pair of gate circuits for

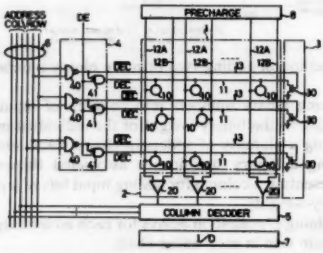
selectively transmitting the complementary internal signals latched by said latch according to output control signals; a pair of output MOSFETs coupled in series between first and second supply voltages and each having a gate coupled to an output of a respective one of said pair of gate circuits for receiving a respective one of an inverted and noninverted output signal of said pair of gate circuits; and means for presetting said latch so that said output buffer is set in a logic HIGH output state at the start of an output operation.

5,161,121

RANDOM ACCESS MEMORY INCLUDING WORD LINE CLAMPING CIRCUITS

Shizuo Cho, Tokyo, Japan, assignor to OKI Electric Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 367,023, Jun. 16, 1989, abandoned. This application Jun. 6, 1991, Ser. No. 711,325
Claims priority, application Japan, Jun. 27, 1988, 63-158315
Int. Cl.[5] G11C *7/02, 11/408, 11/415*
U.S. Cl. 365—189.06 **2 Claims**



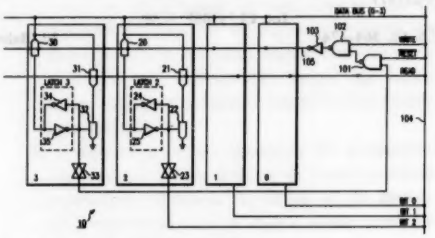
1. A memory comprising:
a plurality of word lines respectively extending in a word line direction, said word lines each having first and second separated end portions;
a plurality of bit lines respectively extending in a bit line direction so as to intersect said word lines;
a plurality of memory cells coupled to said word lines and bit lines so as to form a memory matrix;
a plurality of clamp signal lines respectively extending in said word line direction;
a decoder including a plurality of logic circuits, each located adjacent to a first end portion of a respective one of said word lines and generating a respective first signal, each one of said plurality of logic circuits having an inverting circuit to receive a corresponding first signal and to output a corresponding second signal having an inverted logic level opposite to a logic level of the corresponding first signal, each of said plurality of logic circuits applying its respective second signal to an adjacent first end portion of a corresponding one of said word lines and applying the corresponding first signal to a corresponding one of said clamp signal lines; and
a plurality of switching elements, each coupled to a corresponding one of said plurality of logic circuits, each switching element having first, second and control electrodes, located adjacent and connected at the first electrode thereof to the second end portion of a respective one of the word lines to whose first end portion the corresponding logic circuit is connected, receiving a corresponding first signal at the control electrode thereof through a corresponding clamp signal line connecting the adjacent second end portion of the respective one of the word lines to ground through the second electrode thereof upon the corresponding first signal being at a first logic level, and disconnecting the adjacent second end portion of the respective one of the word lines from ground by changing the corresponding first signal appearing at the control electrode thereof to a second logic level prior to the corresponding second signal changing to the first logic level.

5,161,122

REGISTER WRITE BIT PROTECTION APPARATUS AND METHOD

Iain C. Robertson, Bedford, Great Britain, assignor to Texas Instruments, Incorporated, Dallas, Tex.

Filed Jul. 28, 1989, Ser. No. 387,553
Int. Cl.[5] G11C *7/00*; G06F *12/14*
U.S. Cl. 365—195 **13 Claims**



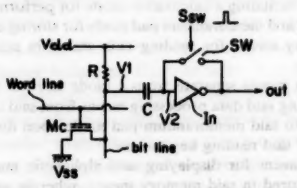
1. A computer system, comprising:
a first processor; and
a second processor comprising:
a central processing unit;
a communications interface and an internal bus connecting the communications interface to said central processing unit, said communications interface connected for data transfer between said central processing unit and said first processor;
at least one register including bit storage circuits connected to said internal bus; and
a protection circuit connected to a control line from said internal bus to enable entry of data into said at least one register from said internal bus when the control line is active, and fed by at least one of said bit storage circuits having one of first and second sates, said protection circuit responsive to the first state to prevent entry of the data into any of said bit storage circuits even when the control line is active.

5,161,123

SEMICONDUCTOR MEMORY

Hidenobu Mochizuki, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed May 24, 1990, Ser. No. 527,821
Claims priority, application Japan, May 25, 1989, 1-134120
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—204 **6 Claims**



1. A semiconductor memory comprising:
a bit line;
a word line;
a memory cell comprising a MOS transistor operatively connected between said bit line and said word line;
a sense amplifier coupled to said bit line, said sense amplifier

comprising an inverter with an input coupled to said bit line and a switch coupled between said input and an output of said inverter, said switch operatively controlled so as to momentarily close prior to every read out of said bit line in response to an address transition signal to thereby place said output and said input at the same potential; and

means for coupling said input of said inverter and said bit line transmitting only a change in potential on said bit line caused by current flow in said MOS transistor.

5,161,124

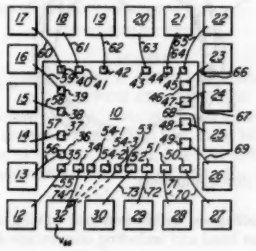
BOND PROGRAMMABLE INTEGRATED CIRCUIT

Andrew M. Love, Stafford, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 263,590, Oct. 27, 1988, Pat. No. 5,023,843. This application Jun. 10, 1991, Ser. No. 712,388

Int. Cl.[5] G11C *13/00*

U.S. Cl. 361—222 **31 Claims**



19. A semiconductor memory device integrated into a single semiconductor substrate that is bond programmable to select different options, comprising:

an array of memory cells;

support circuitry to read information from the memory cells and write information to the memory cells;

option circuitry, responsive to voltage, to operate the array and support circuitry in different modes;

a bond pad connected to the option circuitry, coupled to a first voltage, and bondable to a second voltage; and

wherein the option circuitry operates the array and support circuitry in one mode when the bond pad is not bonded to the second voltage and wherein the option circuitry operates the array and support circuitry in another mode when the bond pad is bonded to the first voltage.

5,161,125

RADIATION SELECTIVE SYSTEM FOR TARGET RANGE AND IMAGING READOUT

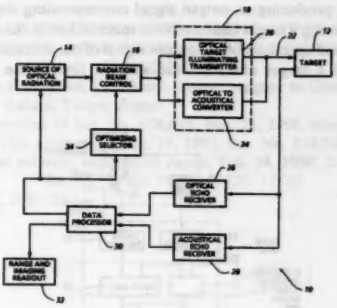
Bruce Maccabee, Sabillasville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 5, 1992, Ser. No. 878,597

Int. Cl.[5] G01S *15/00*

U.S. Cl. 367—99 **11 Claims**

1. In combination with a source of optical radiation and means for converting the optical radiation into acoustical radiation, a system for obtaining tracking data with respect to a target to which the radiation is propagated through an attenuating medium, comprising: radiation control means operatively associated with said source for alternative transmission of the optical radiation and the acoustical radiation to said target through the attenuating medium, echo receiver means for reception of transmitted optical and acoustical radiation reflected from the target, data processing means operatively connected to the echo receiver means for extracting the target tracking data from said reception of the radiation by the echo receiver means and data optimizing means operatively connected to the data processing means and the radiation control



means for selection of the optical or acoustical radiation alternatively transmitted to the target.

5,161,126

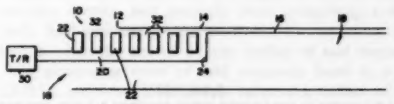
ACOUSTIC FLUTE WEB EDGE SENSOR

Michael A. Marcus, Honeoye Falls, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 29, 1991, Ser. No. 706,625

Int. Cl.[5] G01S *15/00*

U.S. Cl. 367—99 **26 Claims**



1. A web edge sensor comprising:

a) means for defining an acoustic pipe having an opening located so that the edge of a web covers a portion of the opening as a function of the position of the web; and

b) means operatively associated with said acoustic pipe for causing an air column in said pipe to resonate so that the resultant acoustic signal has a resonant frequency spectrum which is a function of the portion of the opening which is covered by the web.

5,161,127

METHOD OF DETERMINING THE TARGET DIRECTION AND TARGET RANGE OF SOUND GENERATING TARGETS

Hermann Grosch, Wülfrath, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

PCT No. PCT/EP90/00894, § 371 Date Jan. 3, 1991, § 102(e) Date Jan. 3, 1991, PCT Pub. No. WO91/06874, PCT Pub. Date May 16, 1991

PCT Filed Nov. 2, 1989, Ser. No. 634,180

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1989, 3936359

Int. Cl.[5] G01S *3/80, 11/00*; G01V *1/00*

U.S. Cl. 367—124 **4 Claims**

1. A method of determining the target direction and target range of a sound generating target relative to a sensor arrangement comprised of passive sensors comprising:

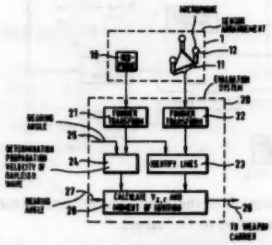
providing the sensor arrangement with a plurality of acoustic sensors for sensing airborne sound generated by the target and for producing an output signal corresponding thereto;

determining the bearing angle (α) of the target relative to the

sensor arrangement from the output signals of the acoustic sensors;

providing the sensor arrangement with a seismic sensor for sensing ground-borne sound generated by the target and for producing an output signal corresponding thereto;

measuring a target characteristic spectral line in the airborne sound spectrum of the output signal of the acoustic sensors and a target characteristic spectral line in the ground-



borne spectrum of the output signal of the seismic sensor for a signal source characteristic of the target to determine the Doppler shift of the respective signals;

calculating the radial target velocity ($v_{z,r}$) from the determined Doppler shifts of the measured spectrual lines and from the propagation velocity (C) of the corresponding sound waves; and

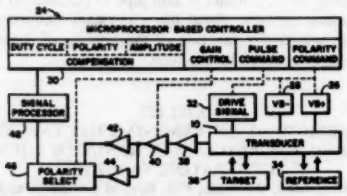
calculating the target range (r) from the bearing angle (α) and the radial target velocity.

5,161,128

CAPACITIVE TRANSDUCER SYSTEM AND METHOD

Martin J. Kenney, Startup, Wash., assignor to Ultrasonic Arrays, Inc., Woodinville, Wash.

Filed Nov. 30, 1990, Ser. No. 621,265
Int. Cl.[5] H04R *19/00*
U.S. Cl. 367—181 **22 Claims**



1. A capacitive transducer system comprising:

a transducer having spaced capacitively coupled electrodes;

a conductive back plate providing one of said electrodes;

a diaphragm overlying said back plate;

said diaphragm including a dielectric film with a metal layer on the surface of said film opposed to said back plate, said metal layer providing the other of said electrodes;

a bias circuit connected to said transducer for applying a bias voltage between said electrodes for biasing said transducer to an operating condition;

a signal circuit connected to said electrodes and including means for applying voltage fluctuations to said transducer;

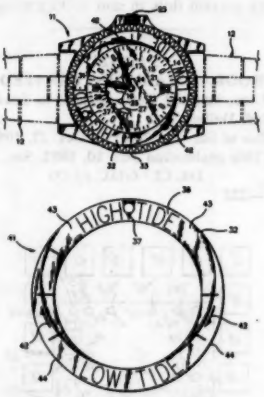
and the improvement characterized by said bias circuit including polarity control means for periodically reversing the polarity of said bias voltage to decrease charging of said dielectric film.

5,161,129

TIDE WATCH

Li Chen, and Pyn Maa, both of Taipei, Taiwan, assignors to Xonix Electronic Watch Enterprise Co., Ltd., Taipei, Taiwan

Filed Dec. 17, 1991, Ser. No. 808,871
Int. Cl.[5] G04B *19/26*
U.S. Cl. 368—19 **4 Claims**



1. A tide watch comprising:

a case;

a timing mechanism within said case having a minute hand and a hour hand and including conventional timekeeping, time setting, gearing and related apparatus, and including means for rotation on a period of 58.8 days;

a time indicating dial mounted to said case in cooperative relationship with said minute and hour hands;

a semi-circular opening in one portion of said dial;

evenly spaced index lines arranged around said opening with a neutral indication {"0"} at the top center, said index lines around said opening indicating an equal number of time periods on either side of said neutral indication {"0"};

a tide indicator disc mounted beneath said dial and connected for rotation to said timing mechanism for one complete revolution every 58.8 days, said disc having thereon indicia cooperatively interrelating with said index lines to show tide times by direct reading; and

a tide indicator bezel mounted to said housing for selective independent rotation about said dial, said bezel having an upper surface which includes indicia showing fullness at high tide time and being graduated to indicate emptiness at low tide time, with a continuous gradual indication of diminishment between the high tide and low tide times in interrelationship with said hour hand.

5,161,130

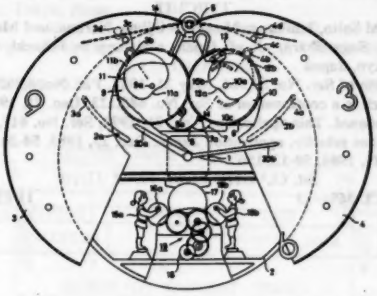
CLOCK WITH OPENABLE DIAL PIECES

Hiroyuki Sato; Nobuhiro Tanaka, and Kenji Ohshima, all of Tokyo, Japan, assignors to Seikosha Co. Ltd., Japan

Filed Oct. 17, 1990, Ser. No. 599,133
Claims priority, application Japan, Oct. 17, 1989, 1-269918
Int. Cl.[5] G04B *19/00*
U.S. Cl. 368—228 **20 Claims**

1. A clock with openable dial pieces comprising: a case containing therein a timepiece movement, a driving motor provided in the case and actuated at any preselected time, a pair of dial pieces disposed in front of the case and openable laterally about a stationary shaft and defining a single time display face in a closed position, a pair of gears provided in the case and rotated in opposite directions by the driving motor, a pair of eccentric cams disposed on the gears, respectively, for

movement therewith, and a pair of cam followers disposed on the dial pieces and engageable with the respective cams so that

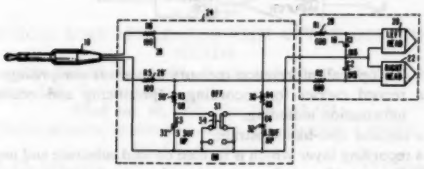


the cam followers are shifted in opposite directions in response to the rotation of the eccentric cams.

5,161,131
IN LINE SWITCHABLE AUDIO ENHANCEMENT DEVICE FOR CD ADAPTER

Robert L. Borchardt, New York, N.Y., and Larry Schotz, Mequon, Wis., assignors to Recoton, Inc., Long Island City, N.Y.

Continuation of Ser. No. 701,151, May 17, 1991, abandoned. This application Mar. 27, 1992, Ser. No. 861,175
Int. Cl.[5] H04B *1/20*
U.S. Cl. 369—1 **3 Claims**

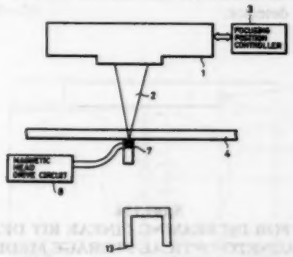


1. A manually switched audio enhancement device comprising a CD adapter usable by a driver seated in the driver's seat of an automobile, said CD adapter insertible in an automobile tape player, a CD player having an output connected to said CD adapter, a flexible electrical conductor comprising a covered elongated electrical wire means connected between said CD player and said CD adapter, said electrical conductor being located proximate to the driver's seat, said audio enhancement device being contained within a housing, said housing comprising a switch to operate said audio enhancement device, said audio enhancement device connected along the electrical conductor between said CD player and said CD adapter enabling the driver to physically reach and feel along the flexible electrical conductor for the housing and switch of the audio enhancement device to switch the audio enhancement device on or off without having to look at said audio enhancement device and switch, said CD adapter comprising magnetic play heads comprising inductance means, an input impedance network including a resistor having a resistance of about 680 ohms emphasizing a high frequency impedance effect, connected between the output of said CD player and said inductance means, said input impedance having a value in combination with that of said inductance means to produce increased signal levels across said magnetic play heads in the high audio frequency ranges and produce a bass boost; and wherein said audio enhancement device further includes: first and second resistors (30) in parallel; first and second capacitors (32) in series with said first and second resistors; and said switch is operable to allow said first resistor to be connected in series with said first capacitor, and said second resistor to be connected in series with said second capacitor when said switch is in an on mode.

5,161,132
MAGNETO-OPTICAL RECORDING APPARATUS INCLUDING A MAGNETIC HEAD OF A PNEUMATIC FLOATING TYPE

Makoto Hiramatsu, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 658,655, Feb. 21, 1991, abandoned. This application Dec. 19, 1991, Ser. No. 810,540
Claims priority, application Japan, Feb. 28, 1990, 2-048175
Int. Cl.[5] G11B *13/04, 5/127, 11/10*
U.S. Cl. 369—13 **7 Claims**



1. An apparatus for applying a magnetic field to a magnetic recording carrier, said apparatus comprising:

a magnetic head for applying the magnetic field to the recording carrier, said magnetic head comprising a magnetic field generating core,

wherein when the size of a cross section of said magnetic field generating core of said magnetic head is A×B (A≧B), and when the distance between a surface of said core facing the recording carrier and a recording layer of the recording carrier is d, a relationship:

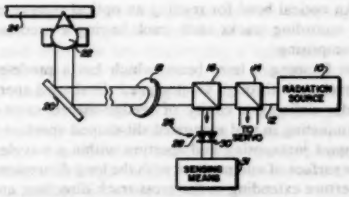
$$0.1\times B<d<0.4\times A$$

is satisfied.

5,161,133
MAGNETO-OPTICAL STORAGE SYSTEM

Marc D. Levenson, Saratoga, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 414,868, Sep. 29, 1989, abandoned. This application Jun. 25, 1991, Ser. No. 722,373
Int. Cl.[5] H04B *1/20*; G11B *5/02, 7/00, 21/10*
U.S. Cl. 369—13 **24 Claims**



1. A magneto-optical storage detection system comprising:

a radiation source for providing a first radiation beam;

means for directing said first radiation beam to a storage medium upon which marks are recorded as domains of a first and a second magnetization states;

means for directing a reflected radiation beam from said recorded medium to a detection channel;

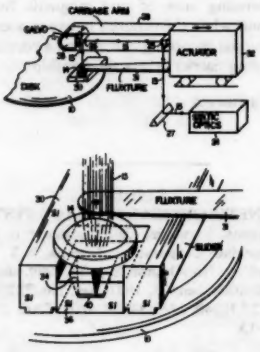
said detection channel comprising a beam adjustment means, a first and a second optical detector in optical communication with the beam adjustment means, and sensing means connected to the first and second optical detectors, said beam adjustment means for adjusting said reflected radiation beam such that when said first radiation beam is located on a transition between said first and second magnetization states of said medium the amount of radiation of said reflected beam on said first optical detector will be substantially unequal to the amount of radiation of said reflected beam on said second optical detector and the sensing means produces a transition signal, and when said first radiation beam is located on a nontransition area the amount of radiation of said reflected beam on said first optical detector will be approximately equal to the amount of radiation of said reflected beam on said second optical detector.

5,161,134

METHOD FOR INCREASING LINEAR BIT DENSITY IN MAGNETO-OPTICAL STORAGE MEDIA

Neville K. S. Lee, Sherborn, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 29, 1989, Ser. No. 373,991
Int. Cl.[5] G11B *11/00, 7/00;* G01J *1/32*
U.S. Cl. 369—13 **16 Claims**



15. An optical head for reading an optical storage medium having recording tracks each track having a predetermined pitch comprising:

a lens focusing a laser beam which has a predetermined wavelength through an elongated slit-shaped aperture;

a slider defining a cavity of wedge-shaped cross-section terminating in said elongated slit-shaped aperture;

a support juxtaposing said aperture within a wavelength of the surface of said medium with the long dimension of said aperture extending in the cross-track direction; and

wherein the long dimension of said aperture is greater than twice the pitch of said tracks and the thickness of the edges of said aperture is substantially less than the wavelength of the light beam

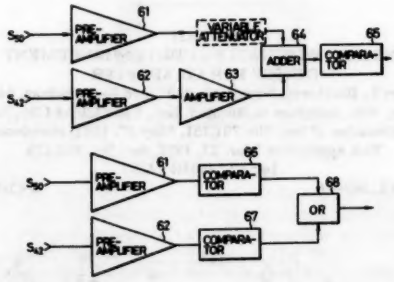
whereby low intensity portions of the focused beam extending from the focal point in the track direction are occluded by said aperture.

5,161,135

MAGNETO-OPTICAL DISC MEMORY APPARATUS INCLUDING A HEADER SIGNAL AND MAGNETO-OPTICAL SIGNAL LEVEL ADJUSTING CIRCUIT

Atsushi Saito, Ichikawa; Masahiro Ojima, Nerima, and Masaru Ito, Sagamihara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 53,564, May 21, 1987, Pat. No. 4,985,881, which is a continuation of Ser. No. 685,123, Dec. 21, 1984, abandoned. This application Nov. 21, 1990, Ser. No. 617,006
Claims priority, application Japan, Dec. 23, 1983, 58-242006; Jun. 29, 1984, 59-133156
Int. Cl.[5] G11B *13/04, 11/12, 11/10*
U.S. Cl. 369—13 **11 Claims**



1. An optical information memory apparatus comprising:

a record carrier for recording, reproducing and erasing information including:

a circular disc-like substrate,

a recording layer which is formed on said substrate and used for recording information by change of a direction of magnetization thereof, and

a guide groove of a plurality of tracks formed in advance and extending in the radial direction with intervals,

each track being divided into a plurality of sectors, each of which includes a header portion in which a header signal containing an address for distinguishing at least said sector is formed in advance with pits of a phase structure and a data portion adjacent to said header portion, and

said guide groove serving as an optical guide for a light beam which records, reproduces and erases information onto said data portion;

an optical head which is movable relative to said record carrier in the radial direction of said record carrier for providing said light beam for enabling at least one of recording, reproducing and erasing of said information;

an optical system for converging said light beam onto said recording layer of said record carrier,

a means for applying a magnetic field to said recording layer for at least enabling recording of said information;

a first detection system for detecting the intensity of the light beam from said recording layer, and

a second detection system for detecting the direction of polarization of the light beam from said recording layer;

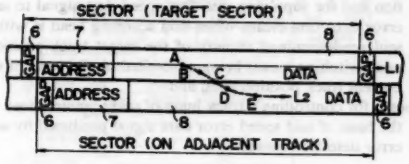
a level adjustment circuit which is connected to said first and second detection circuits and adjusts the levels of a header signal in said header portion which is detected by said first detection system and a data signal in said data portion which is detected by said second detection system.

5,161,136

SERVO ERROR DETECTING METHOD OF AN OPTICAL DISC SYSTEM

Hideki Segawa, Sagamihara, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 14, 1989, Ser. No. 323,301
Claims priority, application Japan, Mar. 14, 1988, 63-59995
Int. Cl.[5] G11B 7/095
U.S. Cl. 369—32 7 Claims



1. A servo error detecting method of an optical disc system in which the disc has a track of consecutive sectors each of which includes a respective sector address identifying the sector, comprising the steps of:

reading the sector address of a target sector in which data is to be recorded or from which data is to be read out and the sector address of the next sector; and

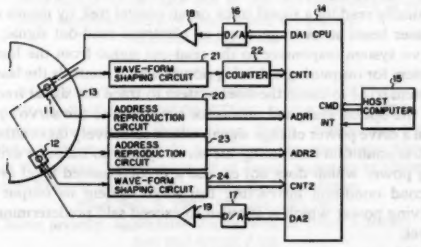
determining the occurrence of a servo error depending on whether or not the sector address read out within a predetermined time period after reading the sector address of the target sector identifies the sector which immediately follows the target sector along the track.

5,161,137

OPTICAL DISK APPARATUS WITH A PLURALITY OF HEADS

Haruyuki Suzuki, Kawasaki, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 10, 1990, Ser. No. 551,451
Claims priority, application Japan, Jul. 12, 1989, 1-180101
Int. Cl.[5] G11B 7/22
U.S. Cl. 369—32 12 Claims



1. An optical disk apparatus comprising:

a plurality of heads for performing erasure of information from, record of information on, and reproduction of information from an optical disk, each of said heads being movable in transverse to tracks on the optical disk for seek movement;

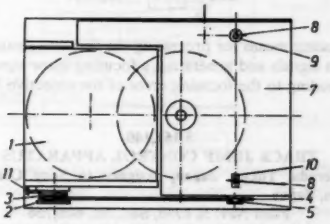
means for driving the heads so as to move the heads to a target track on the disk, said driving means being adapted to apply for the seek movements of the heads a first drive force decided to accelerate or decelerate each of the heads at a substantially constant acceleration and a second drive force which is smaller than the first drive force and decided to move each of the heads at a substantially constant speed to each of the heads in such a manner that when one of the heads is driven by the first drive force, the other heads can be driven by the second drive force only.

5,161,138

DEVICE FOR REMOVING A DISK-SHAPED RECORDED MEDIUM FROM THE COMPARTMENTS OF A MAGAZINE AND FOR PLAYING THE MEDIUM

Johannes Caspers, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Continuation of Ser. No. 235,650, Aug. 24, 1988, abandoned.
This application Feb. 4, 1991, Ser. No. 651,046
Claims priority, application Fed. Rep. of Germany, Aug. 27, 1987, 3728587
Int. Cl.[5] G11B 17/22, 3/38
U.S. Cl. 369—36 13 Claims



1. An arrangement for removing a disk-shaped recorded medium from compartments of a magazine, comprising: a magazine with at least one side from which the disk-shaped recorded medium is to be removed; movable means movable up and down along said side of said magazine from which the disk-shaped recorded medium is to be removed; said movable means being adjacent said side of said magazine and having two oppositely facing sides; means for driving said movable means and located at one of said two oppositely facing sides of said movable means; and spring means supporting said movable means only on the other one of said two oppositely facing sides of said movable means.

5,161,139

FOCUSING ERROR DETECTING APPARATUS

Akino Inoue, Kawasaki, and Isao Hoshino, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

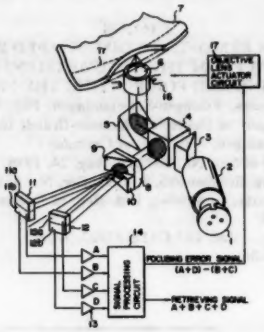
Filed Jan. 4, 1990, Ser. No. 461,035
Claims priority, application Japan, Jan. 6, 1989, 64-933
Int. Cl.[5] G11B 7/00
U.S. Cl. 369—44.23 50 Claims

1. A focusing error detecting apparatus for detecting a focusing error of an objective lens with respect to an object surface, said objective lens converging a light beam emitted from a light source on the object surface, comprising:

optical means for converging the light beam reflected from the object surface in a first direction, giving the light beam a directional aberration in a second direction perpendicular to the first direction, and dividing the light beam into first and second light beams, based on a reference division line extending- in the second direction;

detecting means for generating detection signals based on the first and second light beams, including a first detecting region for detecting the first light beam from the optical means said first detecting region being divided into two detecting region portions by a non-detecting region extending along the reference division line, so that first and second detection signals are generated individually from

the detecting region portions of the first detecting region; and



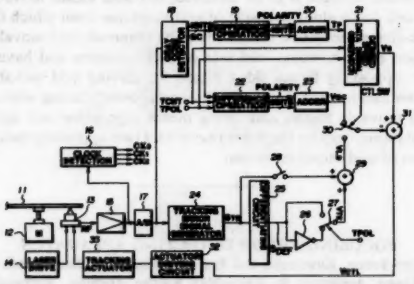
processing means for processing the first and second detection signals and generating a focusing error signal corresponding to the focusing error of the objective lens.

5,161,140

TRACK JUMP CONTROL APPARATUS

Akio Terada, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 5, 1990, Ser. No. 608,754
Claims priority, application Japan, Nov. 15, 1989, 1-295112
Int. Cl.[5] G11B *21/12*
U.S. Cl. 369—44.28 **5 Claims**



1. A track jump control device for controlling movement to a target track of a scanning head scanning recording tracks on a disc-shaped recording medium in response to a generally sinusoidal tracking error signal representing a tracking error of said scanning head with respect to respective ones of said recording tracks in a track pitch direction thereof, comprising

differentiating means for differentiating said sinusoidal tracking error signal to produce a differentiated tracking error signal having first and second opposed polarities when said scanning head is respectively on and off track,

polarity inverting means for inverting one of said first and second opposed polarities of said differentiated tracking error signal to produce a first speed data signal having the same polarity when said scanning head is on-track as when said scanning head is off-track,

current position data detection means for producing current track position data by detecting a current track position of said scanning head from gray code data indicating positions of respective recording tracks of said disc-shaped recording medium on a track-by-track basis,

target speed data signal generating means for forming a target speed data signal on the basis of said current track position data obtained from said current position data detection means,

speed data signal forming means for forming a second speed data signal by detecting changes in said gray code data,

error detection means for producing a speed error data signal indicating an error of a selected one of the first speed data signal and the second speed data signal with respect to the target speed data signal,

switching means for supplying the second speed data signal to said error detection means when said scanning head is outside a predetermined vicinity of the target track position and for supplying said first speed data signal to said error detection means when said scanning head is within said predetermined vicinity of the target track position, said switching means being controlled on the basis of the current track position data, and

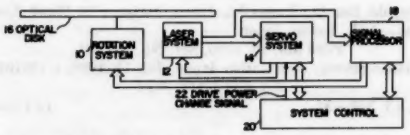
means for controlling a track jump of said scanning head on the basis of said speed error data signal produced by said error detection means.

5,161,141

OPTICAL DISK SYSTEM HAVING A STABLY DRIVEN SERVOMECHANISM FOR A LASER SYSTEM FOR READING SIGNAL TRACKS

Hisashi Sawata, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 161,900, Feb. 29, 1988, abandoned.
This application Nov. 19, 1990, Ser. No. 617,415
Claims priority, application Japan, Feb. 27, 1987, 62-45711
Int. Cl.[5] G11B *7/095*
U.S. Cl. 369—44.25 **5 Claims**



1. An optical disk system comprising a laser system for optically reading a signal track on an optical disk by means of a laser beam so as to generate an electrical read-out signal; a servo system responsive to the read-out signal from the laser system for outputting a driving power which controls the laser system so as to cause the laser system to trace the signal track on the optical disk; and means for supplying to the servo system a drive power change signal, which selectively takes either a first condition instructing the servo system to output a driving power which does not exceed a predetermined level or a second condition instructing the servo system to output a driving power which is allowed to exceed said predetermined level;

said servo system comprising:

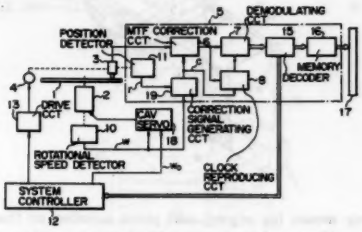
means receiving the read-out signal from the laser system for detecting an error signal indicative of a tracking error included in the read-signal, and for generating a detection signal indicative of whether or not the error signal is larger than a reference level; means responsive to the first condition of the drive power change signal, the error signal, and the detection signal for supplying said laser system with a drive power within a range which does not exceed said predetermined level; and means responsive to the second condition of the drive power change signal and the error signal for supplying said laser system with a drive power which is allowed to exceed said predetermined level, regardless of the detection signal.

5,161,142

DISK PLAYING APPARATUS FOR PLAYING CLV DISKS

Takashi Okano, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jul. 11, 1990, Ser. No. 551,493
Claims priority, application Japan, Aug. 1, 1989, 1-199884
Int. Cl.[5] G11B 7/00
U.S. Cl. 369—50 7 Claims



1. A disk playing apparatus for playing a disk on which a signal is recorded by irradiating a recording light beam at a predetermined linear velocity along a recording track, comprising:

reading means for reading said signal recorded on said disk;

rotation drive means for rotating said disk about a central axis of said disk;

rotational speed detection means for generating a speed signal having a frequency corresponding to a rotational speed of said disk driven by means of said rotation drive means;

signal processing means for processing a read signal read by said reading means, said signal processing means comprising a demodulator for demodulating said read signal obtained by said reading means using a clock signal, a clock signal reproducing circuit for generating said clock signal for said demodulator by using a clock component extracted from said read signal and a correction signal, and a correction signal generating circuit for generating said correction signal according to a linear velocity of said disk at a radial position of said disk at which said signal is being read by said reading means, whereby a frequency of said clock signal gradually varies as said linear velocity varies at said radial position of said disk, wherein said rotation drive means rotates said disk so that the frequency of said speed signal equals a predetermined frequency.

5,161,143

INFORMATION RECORDING-REPRODUCING APPARATUS FOR OPTIMIZING DATA TRANSFER

Yoshihisa Fukushima, Osaka; Isao Satoh, Neyagawa; Yuji Takagi, Hirakata; Yasushi Azumatani, Neyagawa, and Hiroshi Hamasaka, Nishinomiya, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 5, 1991, Ser. No. 650,782
Claims priority, application Japan, Feb. 6, 1990, 2-26495
Int. Cl.[5] G11B 7/00
U.S. Cl. 369—53 8 Claims

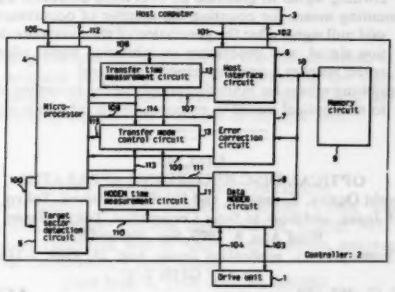
1. An information recording-reproducing apparatus for optimizing data transfer between a host computer and an information recording medium, said apparatus comprising:

a data MODEM circuit for performing a modulation-demodulation operation, said data MODEM circuit modulating data to be recorded on said information recording medium and demodulating data reproduced from said information recording medium, said data MODEM circuit generating a MODEM busy signal during said modulation-demodulation operation;

memory means for storing said data to be recorded and said data reproduced;

a host interface means for controlling a data transfer operation between said host computer and said apparatus, said host interface means generating a data transfer busy signal during a data transfer operation; and

a transfer mode control means for selecting the optimal data transfer operation mode for transferring data between said host computer and said information recording medium, said transfer mode control means determining which one of a duration of said modulation-demodulation operation and a duration of said data transfer operation is longer based on said MODEM busy signal and said data transfer busy signal, said transfer mode control means selecting a



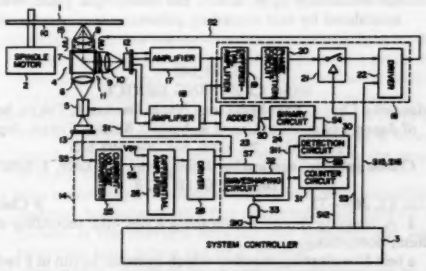
parallel mode in which said modulation-demodulation operation and said data transfer operation are performed in parallel when a duration of said modulation-demodulation operation is longer than a duration of said data transfer operation, said transfer mode control means selecting a buffering mode in which said modulation-demodulation operation and said data transfer operation are performed sequentially when a duration of said data transfer operation is longer than a duration of said modulation-demodulation operation.

5,161,144

SYSTEM FOR RECORDING INFORMATION ON AN OPTICAL RECORDING MEDIUM

Ryoji Takeuchi; Tomohisa Yoshimaru, both of Yokohama, and Akihiko Doi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 27, 1990, Ser. No. 516,968
Claims priority, application Japan, Apr. 28, 1989, 1-110105; Apr. 28, 1989, 1-110106
Int. Cl.[5] G11B 7/00
U.S. Cl. 369—54 9 Claims



1. A system for optically recording information in an optical recording medium, comprising:

recording signal generating means for generating a signal to be recorded;

optical means for generating a recording light beam modu-

lated in response to the recording signal, and guiding the recording light beam to said optical recording medium;

means for detecting a reflected light beam from said optical recording medium and converting said reflected light beam into an electrical signal;

comparing means for comparing the level of said electrical signal from said converting means with a predetermined level to generate a comparison signal if said level of said electrical signal exceeds said predetermined level and a null signal if said level of said electrical signal does not exceed said predetermined level;

detecting means for detecting said null signal with the recording signal to generate an overwrite detection signal;

counting means for counting the number of occurrences of said null signal after the generation of the overwrite detection signal, and generating an inhibition signal after the count reaches a predetermined value; and

inhibiting means for inhibiting supply of the recording signal to said optical means in response to the inhibition signal.

5,161,145

OPTICAL DISC RECORDING APPARATUS

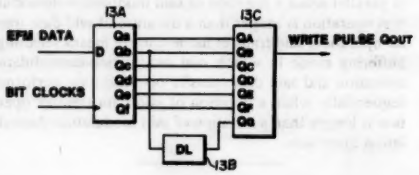
Hiroshi Ogawa, Kanagawa, and Shinichiro Iimura, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 8, 1990, Ser. No. 564,627

Claims priority, application Japan, Aug. 25, 1989, 1-219416

Int. Cl.[5] G11B *7/07*

U.S. Cl. 369—59 **4 Claims**



1. An optical disc recording apparatus for recording information data by irradiating an optical disc having a recording medium having a large thermal time constant with a recording light derived from baseband signals of eight/fourteen modulated (EFM) data having pulse widths of nT, where T designates a predetermined clock bit interval and n is an integer between 3 and 11, said apparatus comprising

recording pulse forming means for forming recording pulses having pulse widths of $(n-1)T$ for $4 \leqq n \leqq 11$ and $(2+DL)T$, where DL is a predetermined time delay, for $n \leqq 3$, and

an optical head recording means supplied with the recording pulses formed by said pulse forming means for producing the recording light which has been light pulse width modulated by said recording pulses.

5,161,146

DISC CLEANING DEVICE

Masahiko Chaya, Yokohama, and Naoki Imokawa, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 26, 1990, Ser. No. 498,633

Claims priority, application Japan, Mar. 30, 1989, 1-76587

Int. Cl.[5] G11B *3/58*

U.S. Cl. 369—72 **9 Claims**

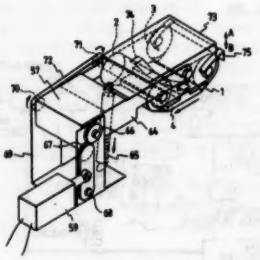
1. A cleaning device for cleaning a disc-like recording medium, comprising:

a belt-like cleaning member which operates to run in a radial direction to the rotating dick-like recording medium so as to clean the surface of the recording medium; and

a pressurizing member for pressing a cleaning surface of said cleaning member against the surface of the recording medium, wherein said pressurizing member comprises;

a plate-like member adapted to come into contact with an inside surface of said cleaning surface of said cleaning member;

a pivot member for pivotably supporting said plate-like member in a running direction of said cleaning member; and



urging means for urging said pivot member so that said plate-like member presses said cleaning member against the recording medium.

5,161,147

HIGH SPEED INFORMATION SYSTEM UTILIZING SCANNING TUNNELING MICROSCOPY IN CONJUNCTION WITH A MODULATED LIGHT SOURCE

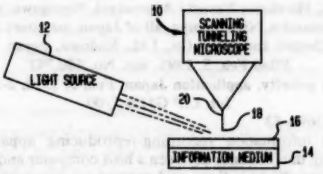
Harris A. Goldberg, Colonia, N.J., and Ronald G. Reifenberger, Tippecanoe, Ind., assignors to Hoechst Celanese Corp., Somerville, N.J.

Filed Aug. 30, 1989, Ser. No. 400,841

The portion of the term of this patent subsequent to Sep. 24, 2008, has been disclaimed.

Int. Cl.[5] G11B *7/00*; G01N *23/00*

U.S. Cl. 369—100 **5 Claims**



1. In an optical information system, a method of recording information on an energy-sensitive substrate comprising passing the tip of a scanning tunneling microscope over the surface of said substrate and modulating a light source so that it selectively irradiates portions of said substrate in areas that are simultaneously subject to electromagnetic energy from said microscope wherein the microscope and light source cooperate to induce a stable detectable change in predetermined portions of the substrate corresponding to information that is recorded thereon by the foregoing process.

5,161,148

OPTICAL PICK-UP USING WAVELENGTH GUIDE WITH GRATING COUPLER THEREIN

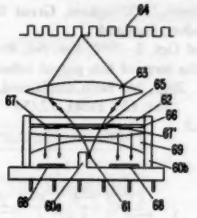
Yoshikazu Hori, Osaka; Hiroaki Yamamoto, Neyagawa, and Fumihiro Sogawa, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Aug. 1, 1989, Ser. No. 487,964

Claims priority, application Japan, Aug. 5, 1988, 63-196556; Aug. 5, 1988, 63-196557

Int. Cl.[5] G11B 7/00

U.S. Cl. 369—112 6 Claims



1. An optical pick up, comprising:

an objective lens for focusing a laser beam onto an optical disk; and

a single assembly integrated device, comprising a single package having therein:

a mount,

a semiconductor lase on said mount for emitting a laser beam to the objective lens,

a waveguide having plural input grating couplers in the center of said waveguide and plural output grating couplers located radially of said input grating couplers in said waveguide, said waveguide being located so as to surround the optical axis of the laser beam and placed above said semiconductor laser, wherein said plural input grating couplers couple the laser beam reflected from a disk into said waveguide and propagate beams to said plural output grating couplers in a direction perpendicular to the optical axis of said semiconductor laser, and said plural output grating couplers radiate the propagated beams therefrom, and

photodetectors located an said mount adjacent to said semiconductor laser, said photodetectors detecting the radiated beams from said output grating couplers.

5,161,149

ELECTRON DENSITY STORAGE DEVICE AND METHOD USING STM

Richard S. Potember, Dayton, Md.; Shoji Yamaguchi, Kobe, Japan, and Carla A. Viands, Adelphi, Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Jul. 22, 1991, Ser. No. 733,770

Int. Cl.[5] G11B 9/10, 9/08

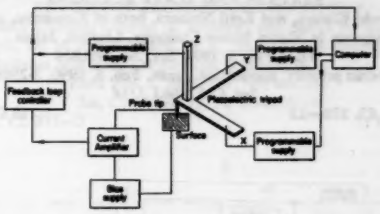
U.S. Cl. 369—126 37 Claims

1. A method for writing, reading and erasing data bits in an information storage device comprising:

providing a data storage medium comprising a substrate and a film of organometallic charge transfer complex material thereon, said film having a thickness and a flat surface provided with a smooth topography, said film having a threshold field strength;

writing a data bit by apply a first electric field to a very small localized portion of the surface of the film, said field exceeding the threshold field strength for the film and changing the electron density of the localized portion of the film;

reading the data bit with a scanning tunneling microscope applying a second electric field less than the threshold field strength for the film to detect the change in electron density of the localized portion;



erasing the data bit by applying a third electric field to the localized portion, said third field having the opposite polarity from the first field applied for writing and an intensity equal to the intensity of the first field.

5,161,150

OPTICAL RECORDING MEDIUM

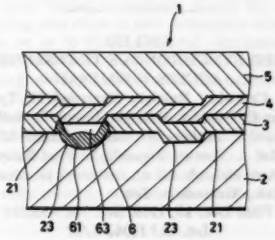
Kenryo Namba, Tokyo; Masahiro Shinkai, Chiba; Sinichi Tezuka, Nagano; Tetsushi Inoue, Chiba; Toshiki Aoi, and Suguru Takayama, both of Nagano, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Mar. 1, 1990, Ser. No. 486,843

Claims priority, application Japan, Mar. 3, 1989, 1-051556; Mar. 17, 1989, 1-065380; Apr. 13, 1989, 1-093363; Aug. 11, 1989, 1-209127; Aug. 11, 1989, 1-209128; Sep. 1, 1989, 1-227089; Dec. 14, 1989, 1-324245; Dec. 26, 1989, 1-336940; Dec. 29, 1989, 1-342989

Int. Cl.[5] G11B 7/24

U.S. Cl. 369—275.4 11 Claims



1. An optical recording medium comprising a substrate of resinous material, a recording layer of a dye-containing recording material on the substrate, and a reflective layer and a protective layer disposed on the recording layer in a close contact relationship, wherein

recording is carried out by directing recording light to the recording layer through the substrate to form a pit in the recording layer and reproduction is carried out by directing reproducing light to the pit through the substrate,

the recording layer has a coefficient of extinction k of up to 0.15 and index of refraction n of at least 1.8 at a wavelength of the recording and reproducing light in the range of from 700 to 900 nm,

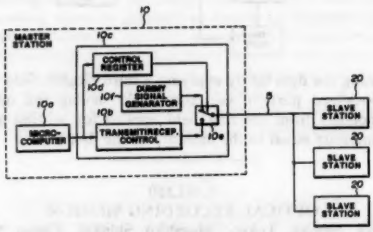
a layer containing a decomposition product of the recording material, but substantially free of the substrate material is present at the interface between said substrate and said recording layer where the pit is formed,

an unrecorded portion of the recording layer where no pit is formed provides a reflectivity of at least 60% and a recorded portion of the recording layer where pits are formed provides a reflectivity of up to 40% of that of the unrecorded portion when the reproducing light is directed to the pit form the substrate side.

5,161,151
SYSTEM AND METHOD FOR CONTROLLING MULTIPLEX COMMUNICATIONS BETWEEN MASTER STATION AND SLAVE STATIONS

Takashi Kimura, and Keiji Nomura, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Feb. 5, 1991, Ser. No. 649,834
Claims priority, application Japan, Feb. 6, 1990, 2-25051
Int. Cl.[5] H04J 3/14
U.S. Cl. 370—13 15 Claims



1. A system for controlling multiplex communication between a master station and a plurality of slave stations using a polling protocol, comprising:

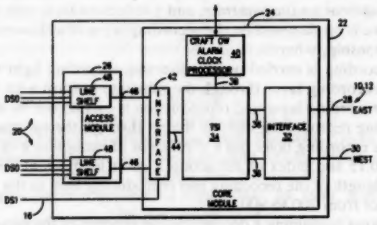
a) first means, installed in the master station, for transmitting a predetermined signal indicating that the master station is operating normally to each slave station via a communication circuit while no communication between the master station and any one of the slave stations is carried out; and

b) second means, installed in each slave station, for receiving the predetermined signal from the master station via the communication circuit and determining that the master station and communication circuit are normal when the predetermined signal is received.

5,161,152
HIGH-SPEED SYNCHRONOUS TRANSMISSION LINE ACCESS TERMINAL

Richard M. Czerwiec, Raleigh; Raymond E. Tyrrell, Wake Forest; Gus C. Sanders, Raleigh; Joseph E. Sutherland, Raleigh; Richard J. Sanders, Jr., Raleigh; Claude M. Hurlocker, Raleigh; Hal A. Thorne, Wendell; V. Paul Runyon, Raleigh, and Enn Aro, Raleigh, all of, assignors to Alcatel Network Systems, Inc., Richardson, Tex.

Filed Dec. 15, 1989, Ser. No. 452,291
Int. Cl.[5] H04J 3/02
U.S. Cl. 370—84 34 Claims



1. A telecommunications terminal for interfacing a high-speed synchronous feeder line with subscriber lines, said terminal comprising:

high-speed interface means for receiving and transmitting high-speed synchronous formatted information from and to time slots in a high-speed feeder line;

subscriber line interface means for receiving and transmitting subscriber information from and to subscriber lines;

time slot interchanging means disposed between said high-speed interface means and subscriber line interface means for interconnecting said interface means and for interchanging subscriber information between time slots of said interface means;

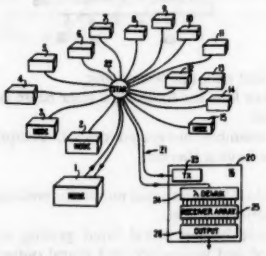
first bus means for connecting the high-speed interface means with said time slot interchanging means; and

second bus means connecting said time slot interchanging means to said subscriber line interface means for conveying subscriber information therebetween in time slots.

5,161,153
SYNCHRONOUS NETWORK

Richard J. Westmore, Willingham, Great Britain, assignor to STC PLC, London, England

Filed Oct. 5, 1990, Ser. No. 594,388
The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.
Int. Cl.[5] H04L 12/56
U.S. Cl. 370—94.3 6 Claims



1. A data communications network, comprising a plurality of terminal stations interconnected by communication means, wherein each terminal broadcasts messages via the communications means to all the other terminals including itself, wherein messages are transmitted in a sequence of frames, each frame comprising a plurality of messages one from each of said terminals, the messages within a frame being received concurrently and in parallel, wherein each terminal includes means for rearranging the received messages into the order of reception of frames and, within each said frame, into a predetermined order.

5,161,154
COMMUNICATION SYSTEM HAVING A VARIED COMMUNICATION RESOURCE GRANT CHANNEL USAGE REQUIREMENT

Rafael J. Diaz, Hoffman Estates, and Gary W. Grube, Palatine, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 12, 1991, Ser. No. 654,146
Int. Cl.[5] H04J 3/16
U.S. Cl. 370—95.1 22 Claims

1. In a communication system having a plurality of communication resources that are allocated by a resource controller, from time to time, amongst a plurality of communication units via an assignment resource, a method of assigning a communication resource comprising the steps of:

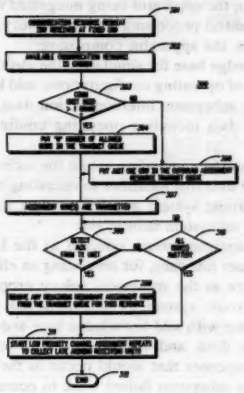
A) receiving a communication resource allocation request from a communication unit;

B) determining that the communication unit is communicating with the resource controller via a communication path having relatively high reliability;

C) when the communication unit is communicating with the resource controller via a communication path having relatively high reliability, assigning a communication resource by transmitting a first resource grant;

D) when the communication unit is not communicating with the resource controller via a communication path having

relatively high reliability, assigning a communication resource by transmitting a second resource grant, wherein



the second resource grant is different than the first resource grant.

5,161,155

AUTOMATIC TELECOMMUNICATIONS SYSTEMS

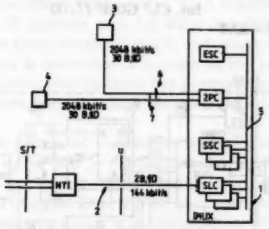
Arthur J. Dyer, and Stephen C. Redman, both of London, England, assignors to STC PLC, London, England

Filed Sep. 21, 1989, Ser. No. 410,338

Claims priority, application United Kingdom, Sep. 30, 1988, 8823079

Int. Cl.[5] H04L *12/56*; H04J *3/12*; H04G *11/04*

U.S. Cl. 370—110.1 **6 Claims**



1. An automatic telecommunications system enabling subscribers to access more than one remote network, wherein the subscribers' lines served include first lines each having access to said remote networks, in which each said first line accesses the remote networks via means including a respective highway for each said first line and an intelligent multiplexer/concentrater to which all of the highways are connected, wherein each highway provides at least two channels usable for conveying traffic signals and one signalling channel, which signalling channel conveys call settings and other signalling for calls set up via any said traffic signal channel, and wherein access of said traffic signal channel to a required remote network is provided in response to a network identifier associated with that remote network and generated in response to signalling from a subscriber, which network identifier is encoded onto the signalling channel, and wherein the intelligent multiplexer/concentrater serves to route each traffic signal channel to the required remote network in response to the network identifier.

5,161,156

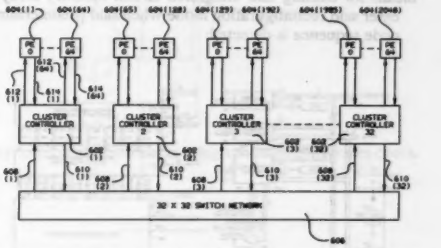
MULTIPROCESSING PACKET SWITCHING CONNECTION SYSTEM HAVING PROVISION FOR ERROR CORRECTION AND RECOVERY

Richard I. Baum; Charles H. Brotman, and James W. Rymarczyk, all of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 2, 1990, Ser. No. 474,440

Int. Cl.[5] G06F *11/10*; H04J *3/26*

U.S. Cl. 371—7 **11 Claims**



1. A multiprocessing system having at least three nodes, comprising:

a first node comprising means to transmit data, said data comprising a message body and destination identifying information indicative of a second node in said system;

a third node coupled to said first node, said third node comprising means for receiving said data along a first path wherein said data has been misrouted to said third node due to an error in said destination identifying information occurring after transmission from said first node, said third node further comprising means for detecting and correcting said error in said destination identifying information so as to form corrected destination identifying information indicative of said second node and means for rerouting said data, along a second independent path, to said second node; and,

a self routing switch, connected in common to said first node, said second node and said third node, said self routing switching comprising means for routing said data between said first node, said second node and said third node, responsive to said destination identifying information.

5,161,157

FIELD-PROGRAMMABLE REDUNDANCY APPARATUS FOR MEMORY ARRAYS

William H. Owen, Los Altos Hills; John Caywood, Sunnyvale; Joseph Drori, San Jose; James Jaffe, Santa Clara; Isao Nojima, Sunnyvale; Jeffrey Sung, and Ping Wang, both of Saratoga, all of Calif., assignors to Xicor, Inc., Milpitas, Calif.

Continuation of Ser. No. 491,749, Mar. 12, 1990, Pat No. 5,153,880. This application Nov. 27, 1991, Ser. No. 802,005

The portion of the term of this patent subsequent to Oct. 6, 2009, has been disclaimed.

Int. Cl.[5] G06F *11/20*

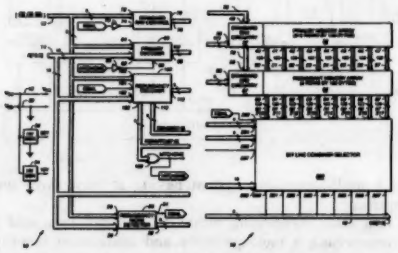
U.S. Cl. 371—10.2 **37 Claims**

1. In an integrated circuit memory array including a plurality of primary memory cells, each said primary memory cell for storing data, a redundant memory cell for storing data, address means for enabling each of said primary memory cells to be accessed when a corresponding unique address is coupled thereto on a plurality of address lines, said address means using standard binary logic voltage levels when coupling said unique address onto said address lines, and binary logic voltage levels when coupling said unique address onto said address lines, and read/write means for reading data from and for writing data to each said primary memory cell on a plurality of data lines

when the address of said primary memory cell is coupled to said address means, said read/write means using standard binary logic voltage levels for data states on said data lines, a field-programmable redundancy system for enabling said integrated circuit memory array to temporarily enter a special reconfiguration mode for replacing a selected one of said primary memory cells with said redundant memory cell such that data is exchanged by said read/write means with said redundant memory cell when the address of said replaced primary memory cell is coupled to said address means, comprising:

means for detecting a predetermined code sequence on one or more of said address and data lines;

means for causing said integrated circuit memory array to enter said reconfiguration mode when said predetermined code sequence is detected;



means responsive to said entry into said reconfiguration mode for disabling normal accessing of said primary memory cells by said address means and said read/write means;

means during said reconfiguration mode for receiving the address of a selected primary memory cell to be replaced by said redundant memory cell;

reconfiguration means responsive to said receiving means during said reconfiguration mode for replacing said selected primary memory cell with said redundant memory cell such that said redundant memory cell is thereafter accessed when the address of said selected primary memory cell is coupled to said address means; and

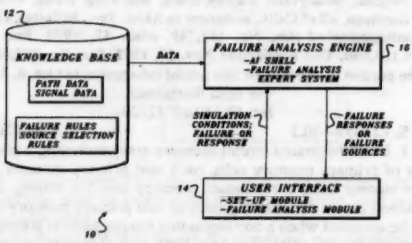
means for causing said integrated circuit memory array to exit said reconfiguration mode.

5,161,158

FAILURE ANALYSIS SYSTEM

Abhijit J. Chakravarty, Renton, Wash., and Yoshiki Nakamura, Yokohama, Japan, assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 16, 1989, Ser. No. 421,579
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—15.1 **12 Claims**



1. An apparatus for analyzing failure effect propagation in an electronic system having at least one system mode, the electronic system comprising a plurality of interconnected subsystems, each of which receives input signals and transmits output signals according to the subsystem's own response logic, wherein said interconnected subsystems include at least two redundant subsystems, which generate identical output signals, and at least one switching mechanism for selecting one of the redundant subsystems as a primary signal source for a destination subsystem, the apparatus being integrated into a processor including a central processing unit, a memory, and input and output devices, the apparatus comprising:

(a) a knowledge base for simulating the electronic system in a variety of operating configurations, said knowledge base including subsystem interconnection data, and rule data, said rule data including operating configuration contingencies;

(b) a user interface including means for receiving simulation condition data that identifies an operating configuration of the electronic system and failure data that identifies at least one subsystem failure; and

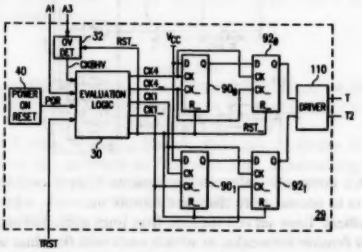
(c) failure analysis means, coupled to the knowledge base and the user interface, for simulating an effect of a subsystem failure as the subsystem failure propagates through the electronic system by analyzing said failure data in accordance with said knowledge base and said simulation condition data, and for generating a set of subsystem failure responses that would occur in the electronic system if the subsystem failure were to occur.

5,161,159

SEMICONDUCTOR MEMORY WITH MULTIPLE CLOCKING FOR TEST MODE ENTRY

David C. McClure, Carrollton, and Thomas A. Coker, Irving, both of Tex., assignors to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.

Filed Aug. 17, 1990, Ser. No. 568,968
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—22.1 **21 Claims**

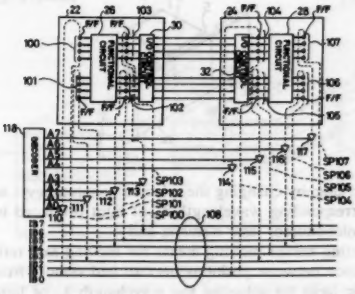


1. An integrated circuit having a normal operating mode, and having a special operating mode enabled by an enable signal, comprising:

a first terminal for receiving pulses of a mode initiate signal indicating entry into a special operating mode; and

an enable circuit, having an input coupled to said first terminal, and having an output for presenting said enable signal responsive to receipt, at said first terminal, of a plurality of pulses of said mode initiate signal, wherein said enable circuit comprises sequential logic for storing a state indicating the receipt of a single pulse of said mode initiate signal and for not presenting said enable signal responsive to receipt, at said first terminal, of a signal pulse of said mode initiate signal.

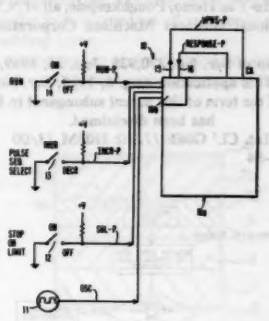
5,161,160
CIRCUIT FOR TESTABILITY
Toshiyuki Yaguchi, and Koichi Tanaka, both of Kawasaki, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Feb. 1, 1990, Ser. No. 472,382
Claims priority, application Japan, Feb. 7, 1989, 1-26593
Int. Cl.[5] H04B *17/00*
U.S. Cl. 371—22.3 **5 Claims**



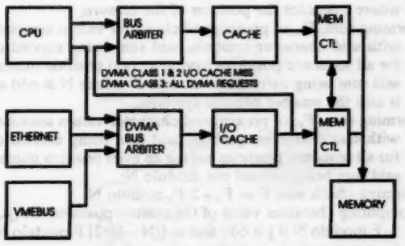
1. An evaluation facilitating circuit incorporated in a logic circuit having a plurality of functional blocks, comprising:
- a plurality of register groups obtained by dividing a plurality of registers provided in each functional block;
- a plurality of scan paths for scanning a plurality of test data used for input and output operations for the register groups, a scan path being provided for each register group: and
- control means for designating the scan paths and controlling the input and output operations of test signals used for testing the register groups,
- wherein a first register group in each functional block is composed of registers used only for the input operations to other functional blocks, a second register group is composed of registers used only for the output operations to other functional blocks and a third register group is composed of registers used for input and output operations to the same functional block, and wherein
- each scan path is connected to a common bus provided in the logic circuit, the common bus comprising a plurality of signal lines through which the test data is transferred, and
- the scan path connected to the first register group is connected to a first pair of signal lines, the scan path connected to the second register group is connected to a second pair of signal lines, and the scan path connected to the third register group is connected to a third pair of signal lines.

5,161,161
MINIMUM PULSEWIDTH TEST MODULE ON CLOCKED LOGIC INTEGRATED CIRCUIT
Behnam Malek-Khosravi, San Diego; Matthew L. McCullough, Carlsbad, and Steven M. Domer, Vista, all of Calif., assignors to Unisys Corporation, Blue Bell, Pa.
Continuation of Ser. No. 304,550, Jan. 31, 1989, abandoned. This application May 30, 1991, Ser. No. 709,075
Int. Cl.[5] G06F *11/24*; H03K *5/156*
U.S. Cl. 371—28 **14 Claims**

9. An integrated circuit chip of the type that contains clocked logic circuitry, wherein aid chip further includes a tester module for determining the minimum pulsewidth at which said clocked logic circuitry will operate; said tester module occupying less than 5% of the chip surface area and including a pulsewidth shaping means for repeatedly generating a sequence of multiple variable width clock pulses with the pulsewidths of said sequence changing monotonically and ranging from being large enough for said clocked logic circuitry to properly operate to being too small for proper operation.



5,161,162
METHOD AND APPARATUS FOR SYSTEM BUS TESTABILITY THROUGH LOOPBACK
John Watkins, Sunnyvale; William C. Van Loo, Palo Alto; Kurt Michels, Tracy, and Hugh Chang, Los Angeles, all of Calif., assignors to Sun Microsystems, Inc., Mountain View, Calif.
Filed Apr. 12, 1990, Ser. No. 508,779
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—29.5 **17 Claims**



7. In a workstation or sever supporting direct memory access (DMA) to system memory, the workstation or sever comprising a central processing unit (CPU), a main memory and a cache subsystem coupled between the CPU and the main memory, and a standard system bus interface coupled to the CPU, the improvement comprising:
- means for the CPU to enable and disable a loopback test mode for the system bus interface;
- means for the CPU, with the loopback test mode enabled, to functionally test data paths and controls utilized to perform programmed I/O accesses to the standard system bus interface;
- means for the CPU to enable and disable DMA transfers in addition to a loopback test mode for the system bus interface; and,
- means for the CPU, with loopback mode set and DMA transfers enabled, to functionally test data paths and controls utilized to perform DMA bus cycles from the system bus interface to the cache subsystem and to the main memory.

5,161,163

METHOD AND APPARATUS FOR PROVIDING ERROR CORRECTION TO SYMBOL LEVEL CODES

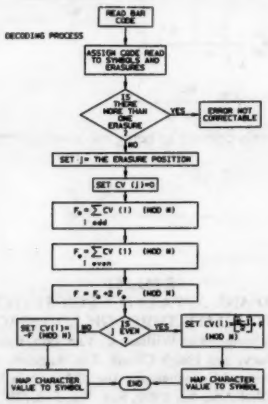
Douglas C. Bossen, Poughkeepsie; Chin-Long Chen, Wappingers Falls, and Mu-Yue Hsiao, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 370,935, Jun. 23, 1989, Pat. No. 5,070,504. This application Aug. 6, 1991, Ser. No. 741,021

The portion of the term of this patent subsequent to Dec. 3, 2008, has been disclaimed.

Int. Cl.[5] G06F *11/10*; H03M *13/00*

U.S. Cl. 371—54 **3 Claims**



1. A method for correcting a received sequence of coded character symbols having one erasure, said method comprising the steps of:

setting initial character value of position j, CV(j), equal to 0, where j denotes the position of the erasure;

forming sum, F_o, of preassigned character values associated with said character symbols, said sum being carried out for all sequence positions having an odd position number, said sum being carried out modulo N where N is odd and is also the number of code symbols;

forming sum, F_e, of preassigned character values associated with said character symbols, said sum being carried out for all sequence positions having an even position number, said sum being carried out modulo N;

forming check sum F as $F_o+2\ F_e$ modulo N;

computing character value of the erasure position, CV(j), as $-F$ modulo N if j is odd and as $[(N-1)/2]\cdot F$ modulo N if j is even; and

associating a corrected erasure position character symbol with character value CV(j) in accordance with said preassigned character value association.

5,161,164

SEMICONDUCTOR LASER DEVICE

Kimio Shigihara; Yutaka Nagai, and Toshitaka Aoyagi, all of Itami, Japan, assignors to Mitsubishi Deni Kabushiki Kaisha, Japan

Filed Apr. 29, 1991, Ser. No. 693,318

Claims priority, application Japan, Aug. 28, 1990, 2-228570

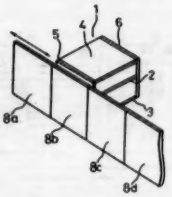
Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—20 **4 Claims**

1. A semiconductor laser device comprising:

a semiconductor laser element having an active layer comprising a quantum well structure having at least 2 energy levels n, where n is an integer, from a first quantum level where n equals 1 to an n-th quantum level where n is equal to at least 2 and opposed front and rear facets having respective reflectivities, the front facet reflectivity and the rear facet reflectivity being asymmetrical so that oscillation can occur at any one of the n quantum levels, thereby producing light of a corresponding wavelength λ_n;

a reflecting mirror movably disposable near to and remote from said rear facet and having a reflectivity for changing reflectivity to light produced by said semiconductor laser element at said rear facet from the rear facet reflectivity



and thereby changing the selected quantum level and the corresponding wavelength λ_n of light produced by said semiconductor laser element; and

reflecting mirror moving means for moving said reflecting mirror between positions near to and remote from said rear facet for selecting the wavelength λ_n of light produced by said semiconductor laser element.

5,161,165

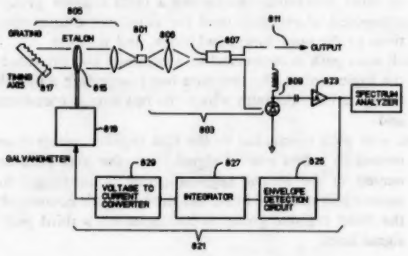
MULTIMODE STABILIZED EXTERNAL CAVITY LASER

Paul Zorabedian, Mountain View, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 26, 1991, Ser. No. 766,595

Int. Cl.[5] H01S *3/13*

U.S. Cl. 372—20 **8 Claims**



1. An etalon stabilized external cavity laser system comprising:

a laser amplifier means for providing a laser beam;

a grating means to reflect the laser beam back to the laser amplifier;

an etalon located between the grating means and the laser amplifier such that the laser beam passes through the etalon;

a laser beam multimode detector means coupled to the laser beam; and

an etalon angle adjustment means for adjusting the angle of the etalon relative to the laser beam and responsive to the multimode detector;

wherein the multimode detector means upon detecting a laser beam multimode operation, causes the etalon angle adjustment means to move the etalon such that the amplitude of all but one mode is reduced.

5,161,166

SEMICONDUCTOR LASER

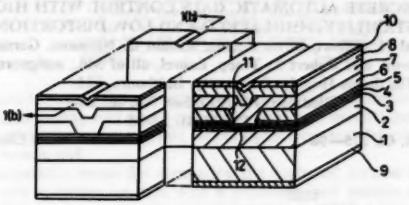
Akihiro Shima, and Kunihiko Isshiki, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 586,197, Sep. 20, 1990. This application Sep. 16, 1991, Ser. No. 760,396

Claims priority, application Japan, Oct. 17, 1989, 1-271027

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—45 12 Claims



1. A semiconductor laser comprising:

a semiconductor substrate of a first conductivity type;

a semiconductor first cladding layer of the first conductivity type disposed on said substrate;

a semiconductor active layer disposed on said first cladding layer and having a central light emitting region of a second conductivity type opposite the first conductivity type;

a semiconductor third cladding layer of the second conductivity type disposed on said active layer including a mesa opposite and projecting away from the light emitting region of said active layer;

a semiconductor current blocking layer of the first conductivity type disposed on said third cladding layer and adjacent said mesa;

a semiconductor fourth cladding layer of the second conductivity type disposed on said current blocking layer and on said mesa;

a semiconductor contacting layer of the second conductivity type disposed on said fourth cladding layer; and

first and second electrodes respectively disposed on said substrate and said contacting layer wherein said laser includes generally parallel first and second facets transverse to said first and second electrodes for transmitting laser light outside said laser and a semiconductor cap layer in said mesa adjacent said fourth cladding layer, said cap layer having the first conductivity type proximate said first and second facets and the second conductivity type elsewhere.

5,161,167

SEMICONDUCTOR LASER PRODUCING VISIBLE LIGHT

Takashi Murakami; Shigeki Kageyama, and Kazuo Mizuguchi, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 18, 1991, Ser. No. 717,046

Claims priority, application Japan, Jun. 21, 1990, 2-163650; Oct. 12, 1990, 2-274700

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—46 15 Claims

1. A semiconductor laser producing visible light comprising:

a first conductivity type GaAs substrate;

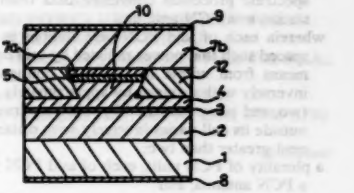
a first conductivity type $(Al_wGa_{1-w})_{0.5}In_{0.5}P$ cladding layer disposed on said substrate;

a $(Al_zGa_{1-z})_{0.5}In_{0.5}P$ active layer disposed on said first conductivity type cladding layer wherein $0 \leqq z \leqq w$;

a second conductivity type $(Al_wGa_{1-w})_{0.5}In_{0.5}P$ cladding layer having a lattice constant and disposed on said active layer;

a first conductivity type $In_{1-x}Ga_xAs_{1-y}P_y$ current blocking layer disposed on part of said second conductivity type cladding layer wherein y is approximately equal to $-2x+2$, $0.5 \leqq x < 1$, and $0 < y \leqq 1$ so that the lattice constant of said current blocking layer is substantially the same as the lattice constant of said second conductivity type cladding layer;

a current concentration and collection structure in contact with said second conductivity type cladding layer for



concentrating current flow in a central part of said active layer;

facets transverse to said cladding layers and said active layer forming an optical resonator therewith for supporting laser oscillation; and

first and second electrodes disposed in contact with said substrate and current concentration and collection structure, respectively.

5,161,168

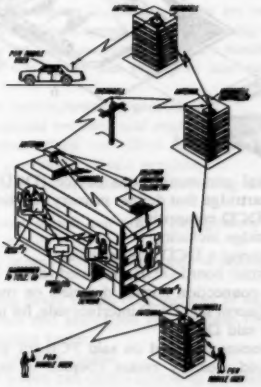
SPREAD SPECTRUM CDMA COMMUNICATIONS SYSTEM MICROWAVE OVERLAY

Donald L. Schilling, Sands Point, N.Y., assignor to SCS Mobilecom, Inc., Port Washington, N.Y.

Filed May 15, 1991, Ser. No. 700,789

Int. Cl.[5] H04K *1/00*

U.S. Cl. 375—1 17 Claims



1. A spread spectrum CDMA communications system for communicating data and/or digitized voice between a plurality of personal-communications network (PCN) units, said spread spectrum communications system located within a same geographical region as occupied by a plurality of narrowband microwave users, each of said narrowband microwave users transmitting with a narrowband bandwidth, said spread-spectrum communications systems using spectrum overlaying the narrowband microwave users, said spread spectrum CDMA communications system comprising:

a plurality of PCN-base stations located within the geo-

graphical region for communicating data to the plurality of PCN units, each of said PCN-base stations having a cell and including,

base means for converting the format of the data into a form suitable for communicating over radio waves;

base-product means for spread spectrum processing the data with a spread-spectrum bandwidth, the spread-spectrum bandwidth having at least four times any of the narrowband bandwidths of said narrowband microwave users;

base means for transmitting across the spectrum, the spread spectrum processed converted data from the PCN-base station to a PCN unit; and

wherein each of said PCN-base stations is geographically spaced such that power radiated by said base-transmitting means from within its cell to a contiguous cell varies inversely with distance by approximately an exponent of two, and power radiated by said base-transmitting means outside its cell varies inversely with distance by an exponent greater than two;

a plurality of PCN units, each of said PCN units including, a PCN antenna; and

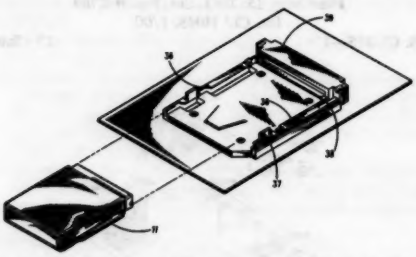
PCN detection means coupled to said PCN antenna and including PCN-spread-spectrum-processing means, for recovering data communicated from said PCN-base station.

5,161,169

DCD WITH REPROGRAMMING INSTRUCTIONS CONTAINED IN REMOVABLE CARTRIDGE

Kenneth P. Galano, Wrentham, and Paul H. Cheverie, Marshfield Hills, both of Mass., assignors to Codex Corporation, Mansfield, Mass.

Filed May 15, 1990, Ser. No. 523,626
Int. Cl.[5] H04B *1/38*
U.S. Cl. 375—8 **13 Claims**



1. A digital communications device (DCD) including a removable cartridge that defines primary functions and operation of said DCD comprising:

A) said cartridge including:

housing having a DCD interface side;

printed circuit board (PCB) mounted to said housing;

electrical connection means, disposed on one end of said PCB adjacent said DCD interface side, for interfacing said PCB to said DCD;

memory means disposed on said PCB for storing instructions, said memory means coupled to said connection means;

sheath means, attached to said housing and having a distal end, for moving relative to said housing and PCB, said sheath means having a first position in which said distal end projects beyond said housing and a second position in which said distal end is closer to said housing than in said first position;

said PCB mounted to said housing such that said electrical connection means is exposed and projects beyond said distal end only when said sheath means is in said second position;

B) means mounted to said DCD for receiving said cartridge and engaging said sheath means, said receiving means including means for establishing electrical connection with said connection means;

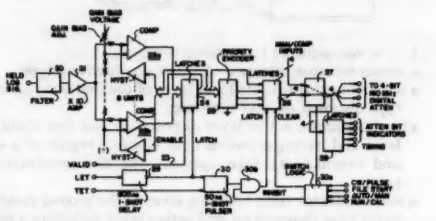
C) said engaging means engaging said sheath means when said cartridge is inserted into said receiving means causing said sheath means to move from said first position to said second position thereby exposing said connection means on said PCB and allowing said establishing means to establish electrical connection with said memory means.

5,161,170

DISCRETE AUTOMATIC GAIN CONTROL WITH HIGH STABILITY, HIGH SPEED AND LOW DISTORTION

Paul H. Gilbert, Silver Spring; Ronald G. Niemann, Germantown, and Robert L. Trapp, Laurel, all of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Jan. 16, 1990, Ser. No. 465,284
Int. Cl.[5] H04L *27/08*
U.S. Cl. 375—98 **8 Claims**



1. In a system for processing an input signal coupled into a main signal path, automatic gain control (AGC) circuitry residing in a gain control path comprising, in combination,

first circuit means for receiving said input signal and sampling its amplitude to control the frequency of changes in gain with reference to designated thresholds,

second circuit means connected to said first circuit means and responsive to the sampled value of said input signal for adjusting the gain applied to said input signal in said signal path,

third circuit means responsive to the occurrence of a gain adjustment to said input signal for limiting the frequency at which said gain adjustments can be made to said input signal in said main signal path during subsequent variation in the amplitude of said input signal,

said input signal is a series of pulses and wherein said second circuit means adjusts the gain of a currently inputted input signal pulse in said main signal path dependent upon the sampled amplitude of the preceding input signal pulse, and

wherein said third circuit means includes hysteresis means rendered effective when a gain adjustment has been made for causing said second circuit means to be ineffective to make a subsequent change in gain adjustment until the amplitude of said input signal varies in excess of a predetermined amount.

5,161,171

DIGITAL DATA TRANSMITTING APPARATUS

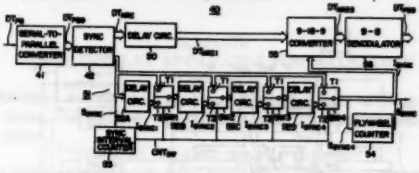
Hideto Suzuki; Yoshikazu Kurose, and Shinji Aoki, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 19, 1990, Ser. No. 584,700
Claims priority, application Japan, Sep. 20, 1989, 1-244468
Int. Cl.[5] H04L *7/08*
U.S. Cl. 375—108 **4 Claims**

1. An apparatus for reproducing digital data which includes information data and synchronous data, and in which said synchronous data has a plural-byte code arranged in a plural-byte code of said information data, said apparatus comprising:

serial-to-parallel converter means for converting a serial data stream of said digital data to a parallel data stream;

detector means for detecting a position of a first-byte code of said synchronous data by comparing each byte of said parallel data stream with a predetermined byte of said synchronous data and providing an output signal corresponding to the detected position;



extractor means for extracting a portion of said synchronous data having said plural-byte code from said parallel data stream in response to said output signal from said detector means; and

comparator means for comparing the extracted portion of said synchronous data with a predetermined pattern of data having a plural-byte code so as to generate a signal when said extracted portion of said synchronous data coincides with said predetermined pattern.

5,161,172

Patent Not Issued For This Number

5,161,173

METHOD OF ADJUSTING THE PHASE OF A CLOCK GENERATOR WITH RESPECT TO A DATA SIGNAL

Rasmus Nordby, Horsholm, Denmark, assignor to NKT A/S NKT Alle, Denmark

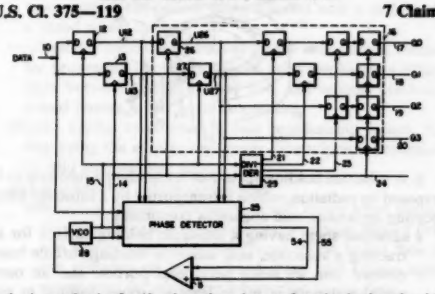
PCT No. PCT/DK89/00157, § 371 Date Dec. 21, 1990, § 102(e) Date Dec. 21, 1990, PCT Pub. No. WO89/12936, PCT Pub. Date Dec. 28, 1989

PCT Filed Jun. 23, 1989, Ser. No. 623,799

Claims priority, application Denmark, Jun. 24, 1988, 3486/88

Int. Cl.[5] H03D *3/24;* **H03K** *9/06*

U.S. Cl. 375—119 **7 Claims**



1. A method of adjusting the phase of a clock signal with respect to the phase of a data signal presenting data in the form of alternating first and second sequences of data bits, said first data bit sequence having data bits that are low at a rising edge of a clock pulse of said clock signal and high at a falling clock pulse edge, while said second data bit sequence has data bits that are high at a rising clock pulse edge and low at a falling clock pulse edge, the method comprising:

generating an auxiliary signal in response to comparing said data signal with said clock signal, said auxiliary signal exhibiting different representations of the phase difference between said data signal and said clock signal dependent upon the particular data bit sequence being compared;

generating a sequence signal responsive to and indicating the particular data sequence being presented by said data signal; and

comparing said sequence signal and said auxiliary signal to generate an actual phase adjustment signal exhibiting the same representation of the phase difference between said data signal and said clock signal for both data bit sequences and having an average value depending on the phase difference between said clock signal and said data signal.

5,161,174

AUTOMATED POWER UNIT ASSEMBLY FOR A COMMERCIAL VEHICLE

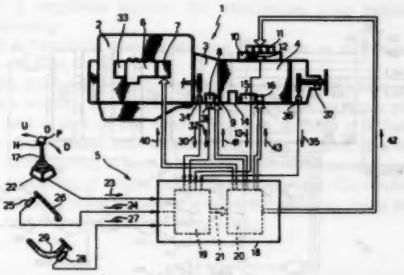
Gian M. Pigozzi, Brescia, Italy, assignor to Iveco Fiat S.p.A., Turin, Italy

Filed Jul. 9, 1991, Ser. No. 727,651

Claims priority, application Italy, Jul. 10, 1990, 67519 A/90

Int. Cl.[5] G06G *7/66*

U.S. Cl. 377—28 **11 Claims**



1. An automated power unit assembly for a vehicle, of the type comprising:

—an internal-combustion engine;

—an injection pump for supplying fuel to said engine, said pump being provided with actuating control means, which can be controlled electrically from outside the assembly, and with adjustment means defining a lower set value corresponding to a minimum speed value for running said engine and an upper set value corresponding to a maximum speed value, above which the fuel supply to said engine is decreased;

—a mechanical, unsynchronised gearbox;

—a clutch interposed between said engine and said gearbox;

—actuating means which can effect engagement and disengagement of gear ratios of said gearbox;

—first valve means for operating said actuating means of said gearbox;

—actuating means which can effect engagement and disengagement of said clutch;

—second valve means for operating said actuating means of said clutch;

—a synchronising brake acting on a member of said gearbox;

—actuating means and associated valve means for operating said synchronising brake;

—manual gear selection means;

—sensor means which can detect operating parameters of said power unit assembly;

—transducer means associated with said manual gear selection means, and

—an electronic processor receiving input signals from said sensor means and said transducer means and adapted to generate control signals for said valve means, said processor comprising first processing means for calculating the engine speed following the engagement of a gear ratio selected by means of said manual gear selection means, and to prevent said engagement if said speed does not come within a programmed range of values, characterized in that said upper set value of said adjustment means (33) of said injection

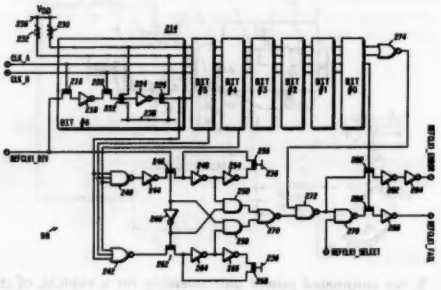
pump (6) corresponds to a speed value of said engine (2) which is above an upper limit of said programmed range of values; said processor (18) also comprising second processing means (60, 61, 62) for detecting an emergency operating condition of said vehicle and for enabling a gear change corresponding to an engine speed above said programmed range of values when said emergency operating condition prevails.

5,161,175

CIRCUIT AND METHOD OF DETECTING AN INVALID CLOCK SIGNAL

Lanny L. Parker, Mesa; Ahmad H. Atriss, Chandler, both of Ariz., and Dean W. Mueller, Portland, Oreg., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 28, 1991, Ser. No. 705,862
Int. Cl.[5] H03K *5/19*
U.S. Cl. 377—70 **16 Claims**



1. A circuit for monitoring a frequency of an input clock signal, comprising:

first means having an input coupled for receiving the input clock signal and having a plurality of outputs for providing samples of the input clock signal at predetermined intervals of time, said first means being responsive to a second clock signal for sampling the input clock signal while shifting previous samples between said plurality of outputs; and

second means coupled to said plurality of outputs of said first means for monitoring logic states thereof during a predetermined number of said second clock signals and providing an output signal having a first logic state when said plurality of outputs have the same logic state after said predetermined number of said second clock signals indicating the input clock signal is valid and an output signal having a second logic state when said plurality of outputs have at least one different logic state after said predetermined number of said second clock signals indicating that the input clock signal is invalid.

5,161,176

EXPOSURE APPARATUS

Ryuichi Ebinuma, Kawasaki; Kunitaka Ozawa, Isehara; Takao Kariya, Hino; Shunichi Uzawa, Tokyo, and Noriyuki Nose, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 718,928, Jun. 25, 1991, abandoned, which is a continuation of Ser. No. 584,796, Sep. 19, 1990, abandoned. This application Dec. 6, 1991, Ser. No. 802,705
Claims priority, application Japan, Sep. 21, 1989, 1-243290
Int. Cl.[5] G21K *5/00*
U.S. Cl. 378—34 **7 Claims**

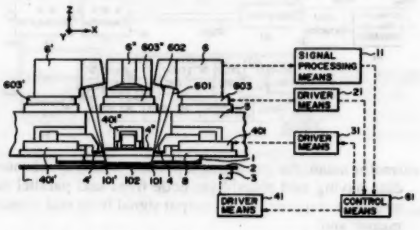
1. An exposure apparatus, comprising:

a light source for emitting a light beam and for exposing a wafer through a mask along an exposure path;

light blocking means being movable and effective to block the light beam emitted from said light source to limit an exposure zone;

positional deviation detecting means for detecting positional deviation between the mask and the wafer and for producing a detection signal; and

drive control means for moving said light blocking means to



execute position control therefor, on the basis of the detection signal produced by said positional deviation detecting means,

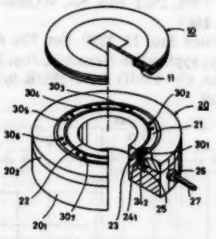
wherein said light blocking means is disposed along the exposure path between said light source and the mask and is disposed between said position detecting means and the mask.

5,161,177

SUBSTRATE HOLDING APPARATUS FOR HOLDING A SUBSTRATE IN AN EXPOSURE APPARATUS

Yuji Chiba, Isehara, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1991, Ser. No. 779,897
Claims priority, application Japan, Oct. 26, 1990, 2-287290
Int. Cl.[5] G21K *5/00*
U.S. Cl. 378—34 **8 Claims**



1. A substrate holding apparatus for holding a substrate to be exposed by radiation, which is transported by a substrate transporting apparatus, said apparatus comprising:

a substrate stage having a substrate holding surface for attracting a substrate, said substrate holding surface being divided into an inner peripheral portion and an outer peripheral portion by at least a groove formed in said substrate stage;

a magnetic member fitted into said groove of said substrate stage;

at least a magnetic unit embedded in said magnetic member, said magnetic unit including a permanent magnet and an electromagnet for eliminating a magnetic force of said permanent magnet when energized; and

moving means for moving said magnetic member together with said magnetic unit in a direction of the depth of said groove between a first position in which the magnetic force of said permanent magnet is effective for the substrate on said substrate holding surface and a second position in which the magnetic force of said permanent mag-

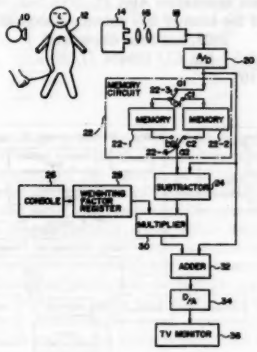
net is ineffective for the substrate on said substrate holding surface.

5,161,178

IMAGE DISPLAY APPARATUS FOR RADIATION DIAGNOSIS

Michitaka Honda, and Yoshinori Nakatani, both of Tochigi, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 26, 1990, Ser. No. 603,836
Claims priority, application Japan, Oct. 26, 1989, 1-277195
Int. Cl.[5] H05G 1/64
U.S. Cl. 378—99 13 Claims



1. An image display apparatus for radiation diagnosis, comprising:

radiation detector means for obtaining image data;

image input means for inputting image data of a plurality of frames obtained by irradiating a radiation onto a patient to be examined, the patient being injected with a catheter in a blood vessel thereof;

emphasizing means, responsive to said image input means, for processing the image data so as to emphasize a difference between image data of first and second predetermined frames in the input image data;

display means, responsive to said emphasizing means, for displaying the emphasized image data which is processed by said emphasizing means; and

said emphasizing means comprising:

subtracting means, responsive to said image input means, for calculating a difference between image data of first and second predetermined frames of the image data of the plurality of frames input from said image input means, and for obtaining subtraction image data;

first filter means, responsive to said subtraction means, for extracting a frequency component higher than a first predetermined frequency of the subtraction image data from said subtracting means;

calculating means, responsive to said first filter means, for processing the subtraction image data extracted from said first filter means by using a predetermined weighting factor, and for weighting the subtraction image data; and

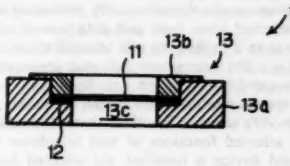
adding means, responsive to said calculating means and said second filter means, for adding the subtraction image data weighted by said calculating means and the image data input from ssid image input means.

5,161,179

BERYLLIUM WINDOW INCORPORATED IN X-RAY RADIATION SYSTEM AND PROCESS OF FABRICATION THEREOF

Kunio Suzuki, and Nobuaki Tomita, both of Shizuoka, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Feb. 27, 1991, Ser. No. 661,135
Int. Cl.[5] G21K 1/00
U.S. Cl. 378—161 18 Claims



1. A beryllium window for transmitting x-ray radiation comprising:

a) a beryllium plate containing beryllium as an essential element;

b) a reinforcing unit for retaining said beryllium plate; and

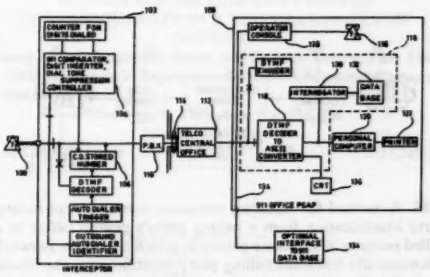
c) a welding film diffused into a part of the beryllium plate and a part of the reinforcing unit through a diffusion phenomenon, said welding film being formed of a substrate having at least one element selected from the group consisting of silver, gold, nickel and copper, the reinforcing unit being formed of a substance allowing the at least one element to diffuse thereinto.

5,161,180

CALL INTERCEPTOR FOR EMERGENCY SYSTEMS

Robert O. Chavous, 9 Orlando Dr., Chattanooga, Tenn. 37415

Filed Oct. 19, 1990, Ser. No. 600,433
Int. Cl.[5] H04M 11/04, 1/57; H04Q 3/72; G08B 26/00
U.S. Cl. 379—45 15 Claims



1. A device, having a data base of information stored in an internal memory, for use as an adjunct to an existing telephone switching and control system and for responsively providing, to 911 and enhanced 911 emergency systems, selected extension identifying information which includes at least the number and location of an extension telephone of said telephone system from which a call comprised of the three digits 911 originates, said device comprising:

sensing means for sensing an off-hook condition of any of a plurality of extension telephones of said telephone system;

detecting means for detecting dialing signals from said extension telephones of said telephone system, whether or not said extension telephones are in said off-hook condition;

selectable responding means for responding to the pressing of a selected single key of said extension telephones as a designated "Panic Button", alternate means of generating

a 911 emergency call, said alternate call generating means being functional without the need for taking said extension telephone off-hook;

identification means for determining whether or to said dialing signals from said extension telephones comprise an emergency 911 call, and whether or not said dialing signals were generated by said selected key of said extension telephones as an alternate, "Panic Button" method for dialing said emergency call;

dial tone processing means for detecting, generating, and suppressing at least one dial tone;

memory access means for selectively retrieving and transmitting selected items from said data base of information in response to a finding by said identification means that said call is a 911 emergency call, and appropriate externally generated interrogation signals;

telephone system conformation means for causing said device to modify selected functions thereof in order to conform to selected functions of said telephone system at which said device is installed, aid selected functions of said telephone system including a need for dialing an access code consisting of at least one digit to access an outside line of said phone system in order to dial 911 , and the inability of said telephone system to reroute said 911 calls;

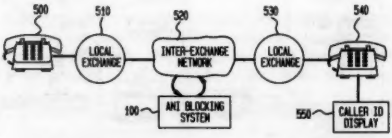
interface means for interfacing with computers, conventional telephones, telephone lines and circuits; and

automatic rerouting means for automatically dialing alternate destination telephone numbers and automatically selecting alternate telephone lines over which to transmit information in case of apparent failure of initially selected route.

5,161,181
AUTOMATIC NUMBER IDENTIFICATION BLOCKING SYSTEM

Nicholas Zwick, Denville, N.J., assignor to Dialogic Corporation, Parsippany, N.J.

Filed Jan. 10, 1990, Ser. No. 463,298
Int. Cl.[5] H04M *1/57, 3/50*
U.S. Cl. 379—67 **21 Claims**



18. A method for blocking automatic transmittal of calling party identification from a calling party's central office to a called party by a telephone network, which telephone network automatically transmits calling party identification, the blocking being effected by having the telephone network transmit an identification other than that of the calling party to the called party, which telephone network offers a blocking service by transferring a telephone call from the calling party which utilizes the blocking service, along with a called party telephone number supplied to the telephone network by the calling party, to apparatus associated with another telephone number other than the calling party identification, the method comprising the steps of:

receiving, at the apparatus associated with the another telephone number, the telephone call from the calling party which was transferred thereto by the telephone network;

obtaining the called party telephone number transferred by the telephone network;

placing a new telephone call to the called party over the telephone network utilizing the called party telephone number, the new telephone call being placed in such a manner that the telephone network utilizes the another telephone number as a new calling party identification which is associated with the new telephone call, the telephone network transmitting the new calling party identification to the called party;

connecting the calling party and the called party;

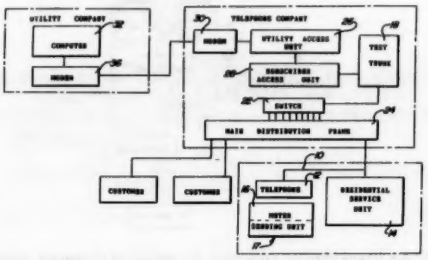
detecting whether the calling party or the called party has gone on-hook; and

terminating the connection between the calling party and the called party when either the calling party or the called party has gone on-hook.

5,161,182
REMOTE METER READING METHOD AND APPARATUS

David P. Merriam; Dale L. Scott, both of Albuquerque, and Bryan F. Scott, Rio Rancho, all of N. Mex., assignors to Sparton Corporation, Jackson, Mich.

Continuation of Ser. No. 333,117, Apr. 4, 1989, Pat. No. 5,010,568. This application Apr. 17, 1991, Ser. No. 686,684
The portion of the term of this patent subsequent to Apr. 23, 2008, has been disclaimed.
Int. Cl.[5] H04M *11/00*
U.S. Cl. 379—107 **4 Claims**



1. For use in a meter reading system using a telephone line for communication of meter data, a transponder comprising:

detecting means for detecting a control signal on the telephone line,

a microprocessor including a read/write memory,

a meter pulse generating means coupled with said meter for producing an electrical meter pulse corresponding to a predetermined meter event,

first coupling means for coupling the meter pulse generating means to the microprocessor,

means for switching the microprocessor from a quiescent mode to an active mode in response to a meter pulse,

the microprocessor being programmed to count pulses from said meter pulse generating means and for storing the pulse count in said read/write memory, and for switching the microprocessor to the quiescent mode after the pulse count is stored,

a data signal generator coupled with the microprocessor,

second coupling means for coupling said detecting means to said microprocessor,

and means for switching the microprocessor from a quiescent to an active mode in response to a control signal, said microprocessor being programmed to cause said data signal generator to transmit encoded data representing the pulse count stored in the read/write memory in response to a predetermined control signal and for switching the microprocessor to the quiescent mode after the encoded data signal is transmitted,

a movable magnetic member carried by said meter and which is cyclically movable along a path having a length corresponding to a predetermined unit of measurement, and a Wiegand sensor having an output coil coupled therewith for producing an output voltage pulse when the

magnetic state of the Wiegand sensor is switched from one polarity to the other, said sensor being disposed adjacent to said path for generating a voltage pulse in response to movement of said magnetic member past said sensor.

5,161,183

OVERVOLTAGE PROTECTION CIRCUITS

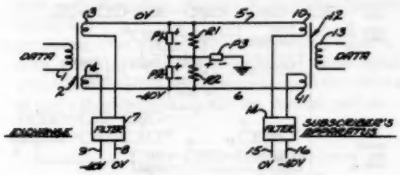
Michael Maytum, Bedford, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 21, 1989, Ser. No. 410,439

Claims priority, application United Kingdom, Nov. 11, 1988, 8826481

Int. Cl.[5] H02H 9/04; H04M 7/00

U.S. Cl. 379—412 **10 Claims**



1. An overvoltage protection circuit having a pair of conductors for covering a balanced signal, a pair of semiconductor protection elements of the same type connected to form a junction therebetween, the pair of elements being connected in series and in the same sense between the pair of conductors, two resistors of substantially equal value respectively connected in parallel with the protection elements of the pair, and a third semiconductor protection element connected from the junction of the pair of protection elements to a point of reference potential, the circuit being such that in use the protection elements present substantially equal capacitances from the conductors of the pair to the point of reference potential.

5,161,184

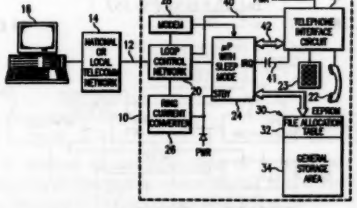
RING-BACK POWERED TELEPHONE WITH NONVOLATILE MEMORY STRUCTURE

Benjamin A. Smith, Celeste, and Steven W. Burnett, Richardson, both of Tex., assignors to Digital Telecommunications Systems, Inc., Dallas, Tex.

Filed Aug. 9, 1989, Ser. No. 391,483

Int. Cl.[5] H04M 1/00

U.S. Cl. 379—413 **39 Claims**



23. A telephone set powered by a telephone line connected thereto, comprising:

a programmable microprocessor having a low power mode and a running mode, and having a sleep mode for maintaining status information therein during the low power mode;

a first circuit receiving periodic signals from the telephone line and converting the signals into a DC power for powering the microprocessor during on-hook conditions of the telephone set;

said microprocessor being in the sleep mode during inactive intervals of the periodic signals and in the running mode during active intervals of the periodic signals; and

a second circuit for powering the microprocessor with a voltage generated by a telephone line loop current during off-hook conditions.

5,161,185

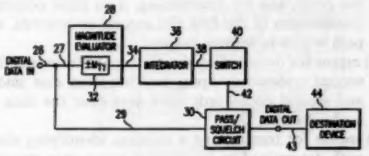
METHOD AND APPARATUS FOR REDUCING NOISE IN A DIGITAL VOLTAGE SIGNAL

James R. Hochschild, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 752,173, Aug. 23, 1991, abandoned, which is a continuation of Ser. No. 369,156, Jun. 21, 1989, abandoned. This application Mar. 11, 1992, Ser. No. 850,243

Int. Cl.[5] H04B 1/10

U.S. Cl. 379—416 **59 Claims**



1. A method of reducing noise in a digital voltage signal directed to a destination device, comprising:

digitally evaluating the magnitude of the digital voltage signal to obtain an evaluated magnitude;

digitally integrating the evaluated magnitude at an integration frequency and over a predetermined time period to generate an average value; and

substituting a null voltage signal for the digital voltage signal to the destination device if the average value is within a first predetermined range of magnitude.

5,161,186

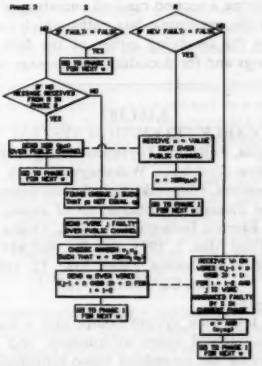
SYSTEM FOR SECURE AND PRIVATE COMMUNICATION IN A TRIPLE-CONNECTED NETWORK

Danny Dolev, Jerusalem, Israel, and Cynthia Dwork, Palo Alto, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 6, 1991, Ser. No. 756,276

Int. Cl.[5] H04L 9/02

U.S. Cl. 380—2 **20 Claims**



20. A digital data processing apparatus for providing secure

and private communication between first and second non-fault, non-adjacent nodes coupled by at least three vertex-disjoint data paths, the digital data processing apparatus comprising:

a data storage medium operating in conjunction with a data storage system of the digital data processing apparatus;

security means for effecting the secure and private communication of a message w, said security means including:

a) means for sending first and second codewords from the first node across the data paths to the second node, the first and second codewords each corresponding to the message w in respective first and second codes;

b) means for receiving the first and second codewords from the data paths and for determining values of the first and second codewords and validity of the first and second codewords within the first and second codes, respectively;

c) means for determining from the values and validity of the first and second codewords whether the first and second codewords were sent over the data paths without error, and for determining, if an error occurred in transmission of the first and second codewords, a data path which is without error;

d) means for determining the message w from said first or second codewords upon determination that said first and second codewords were sent over the data paths without error;

e) means for transmitting a message identifying the data path determined to be without error upon determination that an error occurred in transmission of the first and second codewords;

f) means for sending a third codeword from the first node across the data paths to the second node following transmission of the message, the third codeword corresponding to a random value p in a respective third code;

g) means for receiving the third codeword from the data paths and determining validity of the third codeword within the third code;

h) means for determining from the validity of the third codeword whether the codeword was sent over the data paths without error;

i) means for determining the value p of the third codeword upon determination that the third codeword was sent over the data paths without error;

j) means for transmitting a third codeword vector corresponding to the received third codeword upon determination that the third codeword was sent over the data paths in error;

k) means for encoding the message w using the value p to generate a first encoding and transmitting the first encoding upon determination that the third codeword was sent over the data paths without error;

l) means for comparing the third codeword with the third codeword vector to determine a faulty data path and transmitting a second random encoding of the message w over the remaining data paths which are good; and

m) means for receiving either of the first and second encodings and for decoding the message w therefrom.

5,161,187

CABLE TELEVISION SYSTEM

Harumasa Kajita, Fujisawa; Toyokazu Yanagimichi, Chigasaki; Tetsuo Kariya; Toshikazu Wakabayashi, both of Fujisawa; Ichiro Kawashima, Chigasaki; Satoshi Nakanami, Kamakura, and Masami Tanaka, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 7, 1991, Ser. No. 665,949

Claims priority, application Japan, Mar. 12, 1990, 2-60239

Int. Cl.[5] H04N *7/167*

U.S. Cl. 380—15 **15 Claims**

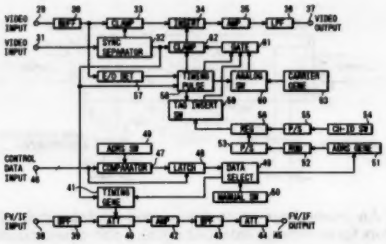
1. A cable television system comprising a transmitter for transmitting scrambled video information, and at least one receiver receiving the scrambled video information from the transmitter, wherein the transmitter comprises:

means for suppressing vertical and horizontal sync information in amplitude to execute selectively scrambling; and

means for superimposing a sync width information signal and key data on a television signal during a predetermined video period within a vertical blanking period, the sync width information signal being modulated at a video band frequency and having a burst form and a predetermined width, the sync width information signal representing whether sync information is present or absent, the key data having a plurality of bits and representing contents of said scrambling;

wherein the receiver comprises:

pulse reproducing means for recovering the sync width information signal and outputting a sync width information pulse corresponding to the sync width information signal;



means for generating a reference signal on the basis of an edge of the sync width information pulse outputted from the pulse reproducing means;

means for extracting the key data from the scrambled video information in response to the reference signal;

means for generating pseudo vertical and horizontal sync signals in response to an edge of the sync width information pulse outputted from the pulse reproducing means; and

means for increasing the vertical and horizontal sync information of the scrambled video information in amplitude in response to the extracted key data at timings determined by the pseudo vertical and horizontal sync signals.

5,161,188

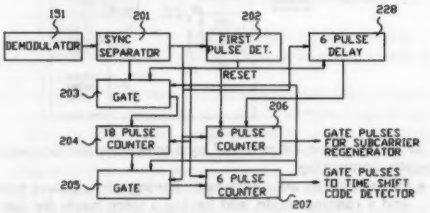
SCRAMBLING VIDEO BY HORIZONTAL AND VERTICAL TIME SHIFTING

H. George Pires, 47H Valley Rd., Hampton, N.J. 08827

Filed Jul. 19, 1991, Ser. No. 732,593

Int. Cl.[5] H04N *7/167*

U.S. Cl. 380—15 **14 Claims**



1. A method of scrambling a video image prior to transmission of a corresponding video signal and unscrambling the video image after transmission of the video signal, the video signal defining a plurality of sequential vertical periods, each vertical period having associated therewith a vertical period synchronization signal portion having a plurality of pre-equal-

izing pulses, having a first width a plurality of serrated pulses, having a second width and a plurality of post-equalizing pulses, having a first width and being provided with a predetermined number of sequential horizontal line information portions arranged sequentially with line synchronization signals interposed in horizontal blanking intervals therebetween, whereby the line information portions and the line synchronization signals combine sequentially during each vertical period to form the video image, the method comprising the steps of:

removing prior to transmission of the video signal said plurality of the serrated pulses of the vertical period synchronization signal portions from between predetermined ones of the line information portions of the video signal for rendering unidentifiable a point of beginning in the video signal of said predetermined ones of the vertical periods in the video signal; replacing said plurality of serrated pulses with a corresponding plurality of pulses having said first width; and

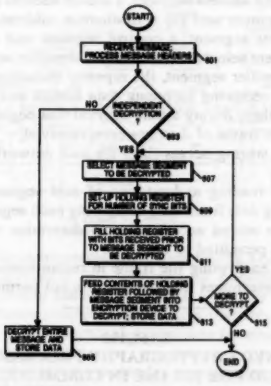
regenerating after transmission of the video signal a pulse train which is incorporated into said video signal and which identifies said point of beginning in the video signal of said predetermined ones of the vertical periods.

5,161,189

ENCRYPTION AND DECRYPTION OF CHAINED MESSAGES

Michelle M. Bray, Streamwood; Michael W. Bright, Arlington Heights, and Hans C. Sowa, Schaumburg, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 11, 1991, Ser. No. 667,151
Int. Cl.[5] H04L 9/02
U.S. Cl. 380—21 **23 Claims**



1. A method of communication of at least two message segments in an encryption system having an encryption device and a decryption device, comprising the steps of:

chaining a data stream and the at least two message segments together into a chained message;

encrypting said chained message;

transmitting said encrypted chained message to the decryption device;

receiving said encrypted chained message at the decryption device; and

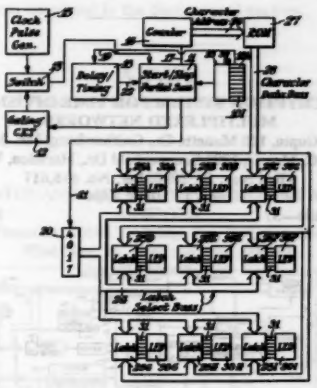
independently decrypting any segment of said encrypted chained message, without decrypting any other segment of said encrypted chained message.

5,161,190

SYSTEM FOR ENCRYPTION AND IDENTIFICATION

John P. Cairns, Townsend, Del., assignor to Computer Security Corp., St. Georges, Del.

Continuation-in-part of Ser. No. 95,405, Sep. 10, 1987, Pat. No. 4,962,530. This application Oct. 5, 1990, Ser. No. 593,663
The portion of the term of this patent subsequent to Oct. 9, 2007, has been disclaimed.
Int. Cl.[5] G06F 3/02
U.S. Cl. 380—23 **11 Claims**



1. A security apparatus for identification of a preselected code of characters by a predetermined cryptograph of symbols.

comprising in combination a plurality of latches,

a predetermined program of a preselected code of symbols consisting of alphanumeric characters in binary coded decimals and matrix coefficient in a first memory having potential levels at addresses,

selectively operable switches,

means for providing pulses to said addresses in said first memory

upon the operation of a switch,

means for transmitting the potential levels of said binary coded decimals from said first memory to said plurality of latches,

means for storing said binary coded decimals in said latches whereby each transmitted binary coded decimal is stored in a latch,

means upon said operation of said switch for generating a pulse to a delay timing circuit,

means for transmitting a delayed signal from said delay timing circuit to produce a timed sequence of signals selected to be transmitted to said selected latches subsequent to the storage of the binary coded decimals in said latches,

means for transmitting the stored binary decimals in each of said latches to a decoding circuit and to a sending circuit,

means for decoding the stored binary coded decimals in the decoding circuit to read out the potential levels to segments of a light emitting diode,

means electrically connecting one of said selectively operable switches to said sending circuit for providing a signal to said sending circuit upon operation of said switch.

means for depositing the binary coded decimal from said sending circuit on an electrical connection to a microprocessor upon transmission of said signal from said switch,

said microprocessor having a second memory accessed by the microprocessor, said microprocessor being operative for executing a program stored in said second memory,

means for storing in said second memory at least one access

code of a preselected code of symbols consisting of at least one alpha-numeric character and at least one matrix coefficient,

operative to sequentially enter to said microprocessor pulses defining said actuated code of symbols,

said microprocessor having means for comparing the binary coded decimal produced by the operation of the sending circuit with the stored access code,

and delay means included in said apparatus for delaying the operation of one or more of said means.

5,161,191

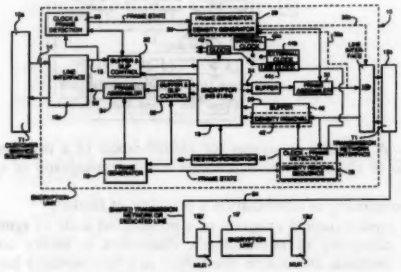
ENCRYPTION SYSTEM FOR TIME DIVISION MULTIPLEXED NETWORKS

Shanti S. Gupta, 100 Manette Ct., Gaithersburg, Md. 20878, and Darryl C. Morris, 1209 Summerfield Dr., Herndon, Va. 22070

Filed Nov. 27, 1990, Ser. No. 618,617

Int. Cl.[5] H04K *1/04*

U.S. Cl. 380—37 **16 Claims**



1. An encryption system for interfacing with a time division multiplexing (TDM) telecommunications arrangement, said encryption system providing encryption of data received by said telecommunications arrangement and the telecommunications arrangement producing an in-band TDM data stream formatted into TEM frames including a predetermined number of individual in-band TDM framing bits located at corresponding individual original in-band framing bit locations, said encryption system including a local side comprising:

means for receiving from said telecommunications arrangement a first in-band TDM data stream to be encrypted;

means for removing each of said individual in-band TDM framing bits from the received in-band TDM data stream;

means for encrypting said received in-band TDM data stream after said framing bits are removed to produce an encrypted data stream; and

means for reinserting each of said individual in-band TDM framing bits into a said corresponding individual original framing bit location in said encrypted TDM data stream to produce an encrypted data stream with reinserted in-band TDM framing bits; and

said system further including a remote side comprising:

means for receiving said encrypted data stream with inserted in-band TDM framing bits, for removing said in-band TDM framing bits therefrom, and for decrypting the received encrypted data stream to produce a second TDM data stream; and means for reinserting said in-band TDM framing bits into said second TDM data stream at said corresponding original framing bit locations so as to produce a third in-band TDM data stream that corresponds to said first in-band TDM data stream.

5,161,192

REPEATERS FOR SECURE LOCAL AREA NETWORKS

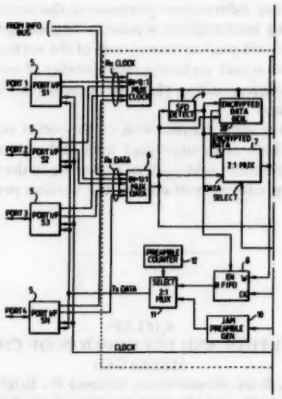
Steven H. Carter, Great Missenden; Terence D. Lockyer, Luton, and Christopher J. Gahan, Kings Langley, all of Great Britain, assignors to 3COM Technologies, Ltd., Cayman Islands

Filed Nov. 7, 1990, Ser. No. 609,791

Claims priority, application United Kingdom, Dec. 6, 1989, 8927623

Int. Cl.[5] H04B *3/36, 3/58*; H04L *25/20, 25/52*

U.S. Cl. 380—48 **17 Claims**



10. A repeater for use in a local area data network for providing communication between a plurality of network connected devices connected to the repeater, which data network receives data frames of present format, each of which includes at predetermined positions in the frame segments selected from (i) a destination address segment, a source address segment and a control segment and (ii) a destination address segment, a source address segment, a control segment and at least one further segment selected from a frame identifier segment and a protocol identifier segment, the repeater including:

means for receiving incoming data frames and for retransmitting them during a time interval that begins before the complete frame of data has been received;

means for storing access rules for said network connected devices;

means for reading at least one of said segments of each incoming data frame and comparing each segment so read with the stored access rules to determine whether the frame is permitted or not; and

means for encrypting the frame in retransmission if the repeater determines that the frame is not permitted.

5,161,193

PIPELINED CRYPTOGRAPHY PROCESSOR AND METHOD FOR ITS USE IN COMMUNICATION NETWORKS

Butler W. Lampson, Cambridge; William R. Hawe, Pepperell; Amar Gupta, Northboro, and Barry A. Spinney, Wayland, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 29, 1990, Ser. No. 546,632

Int. Cl.[5] H04L *9/02*

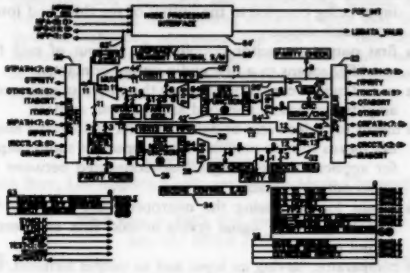
U.S. Cl. 380—49 **15 Claims**

1. A cryptographic processor for use in a communications network, the processor comprising:

data encryption/decryption means;

first and second interface circuits connected between the data encryption/decryption means and two in-line processing entities in a network architecture;

wherein the encryption/decryption means includes a receive path, for decrypting incoming packets that contain encrypted data as they are received through the first interface circuit, and passing decrypted data for output through the second interface circuit, and a transmit path for encrypting data packets received through the second interface of encryption is called for;



and wherein the cryptographic processor is insertable between the two processing entities;

and wherein the receive path includes means for deciding whether an incoming packet contains encrypted data, which is to be decrypted, and means for locating the encrypted data within the received packet.

5,161,194

SATELLITE COMMUNICATIONS SYSTEM OPERATING IN ASYNCHRONOUS MODE FOR CENTRAL-TO-TERMINAL STATION TRANSMISSION

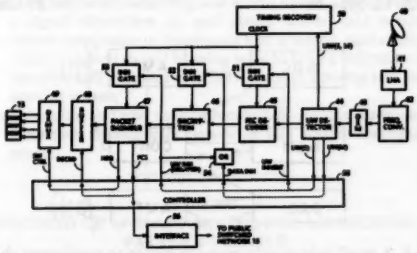
Mikio Ujiie, Tokyo, assignor to NEC Corporation, Japan

Filed Jul. 30, 1990, Ser. No. 559,257

Claims priority, application Japan, Jul. 31, 1989, 1-198221

Int. Cl.[5] H04L *9/02*

U.S. Cl. 380—48 **9 Claims**



1. A satellite communications system having a central station serving central-station data terminals for transmitting signals through a one-way satellite channel to a satellite transponder which broadcasts received signals to a plurality of terminal stations each serving terminal-station data terminals, said central station comprising:

unique word generator means for generating a unique word at periodic intervals;

packet assembler means including means for composing blocks of data from the central-station data terminals into packets, each of the packets further containing an address of a data terminal of said terminal stations and asynchronously supplying the packets to an output terminal of the packet assembler means, said packet assembler means further including means for stopping operation of said packet composing means at the beginning of said unique word to allow said unique word to be supplied to said output terminal and restarting operation of said packet composing means at the end of said unique word;

encrypting means connected to said output terminal of the packet assembler means for encrypting said packets while not encrypting said unique words, and generating a series of encrypted packets and nonencrypted unique words for transmission to said satellite transponder; and

each of said terminal stations comprising:

unique word detector means for detecting a unique word from a signal received from said satellite transponder to generate a timing signal;

decrypting means for decrypting the encrypted packets in said received signal in response to said timing signal; and

packet deassembler means for decomposing the deciphered packets into blocks of data, and applying the data blocks to the terminal-station data terminals according to the address contained in the decomposed packets.

5,161,195

Patent Not Issued For This Number

5,161,196

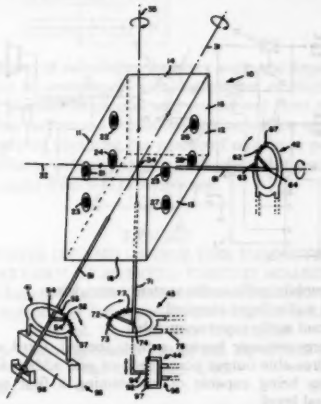
APPARATUS AND METHOD FOR REDUCING MOTION SICKNESS

John L. Ferguson, 11805 Trailridge Dr., Potomac, Md. 20854

Filed Nov. 21, 1990, Ser. No. 618,263

Int. Cl.[5] H04R *3/00*

U.S. Cl. 381—1 **9 Claims**



2. Apparatus for relieving the onset or severity of motion sickness which is caused by the angular and heaving motion of an enclosure or compartment of a ship in the water, a plane in the air, or a spacecraft in space, comprising mounting two or more sound emitters on a side of the enclosure, at least two of said emitters being mounted at different elevations in the enclosure, means for sensing the angular movement of the enclosure away from a predetermined reference position, and varying the volume of sound selectively from the emitters as the enclosure moves away from the reference position, thereby creating a continuously perceivable inertially stable, substantially stationary sound horizon in the enclosure.

5,161,197

ACOUSTIC ANALYSIS

David H. Griesinger, Cambridge, Mass., assignor to Lexicon, Inc., Waltham, Mass.

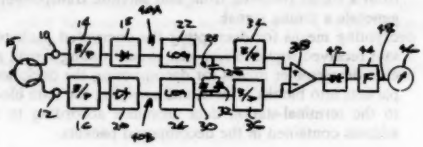
Filed Nov. 4, 1991, Ser. No. 787,532

Int. Cl.[5] H04R *29/00, 5/027*

U.S. Cl. 381—56 **20 Claims**

1. Spatial impression indicating apparatus comprising two channels, each said channel having a microphone input, a first band pass filter of less than about one octave pass band con-

nected to its microphone input, and circuitry for limiting fluctuating amplitude information in signals from said first band pass filter to frequencies in a band from about five hertz to thirty hertz, said microphones being spaced about one-quarter



meter apart and said first band pass filters having the same center frequency, said channels being connected to comparison circuitry for comparing the limited fluctuating amplitude information signals, an output device, and circuitry coupling the output of said comparison circuitry to said output device.

5,161,198

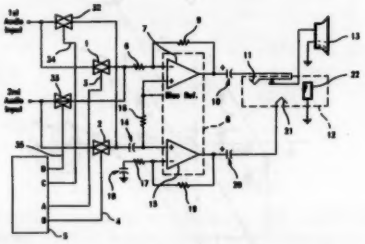
MOBILE RADIO AUDIO SYSTEM

Scott W. Noble, Lawrence, Kans., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed May 15, 1991, Ser. No. 700,745

Int. Cl.[5] H04B *3/00*

U.S. Cl. 381—81 **2 Claims**



1. A mobile radio audio system comprising:

a first audio input terminal;

a second audio input terminal;

a microprocessor having a first, second, third and fourth addressable output ports, each of said addressable output ports being capable of maintaining a first and second signal level;

a first solid-state attenuator means having an input, an output and a control terminal, said first attenuator means having its input coupled to the first audio input terminal, and its control terminal coupled to the first output port of the microprocessor, and said first solid state-attenuator means being responsive to the signal level of the first output port of the microprocessor;

a second solid-state attenuator means having an input, an output and a control terminal, said second attenuator means having its input coupled to the second input terminal, and its control terminal coupled to the second output port of the microprocessor, and said second solid state-attenuator means being responsive to the signal level of the second output port of the microprocessor;

a third solid-state attenuator means having an input, an output and a control terminal, said third attenuator means having its input coupled to the first audio input terminal, and its control terminal coupled to the third output port of the microprocessor, and said third solid state-attenuator means being responsive to the signal level of the third output port of the microprocessor;

a fourth solid-state attenuator means having an input, an output and a control terminal, said fourth attenuator means having its input coupled to the second input terminal, and its control terminal coupled to the fourth output port of the microprocessor, and said fourth solid state-attenuator means being responsive to the signal level of the fourth output port of the microprocessor;

a first amplifier means having an input and an output, said input being coupled to the output of the first and second attenuator means;

a second amplifier means having an input and an output, said input being coupled to the output of the third and fourth attenuator means;

a first output capacitor coupling the output of said first amplifier means to a first audio output contact;

a second output capacitor coupling the output of said second amplifier means to a second audio output contact;

a means for selectively bridging the first and second amplifier means so as to combine their respective audio outputs for application to a single load connected between the audio output contacts;

a means for addressing the microprocessor to effect the switching of the signal levels at said first and second output ports;

a comparator, having an input and an output terminal, said input terminal coupled to one of said audio output contacts, and said output terminal being capable of maintaining a first and second output signal level, dependant upon the impedance evident at the audio output contact to which the comparator input is coupled; and

a means for switching the signal level at one of said addressable microprocessor output ports in response to the signal level evident at said comparator output terminal.

5,161,199

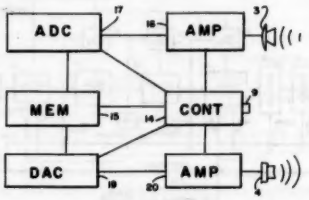
ELECTRONIC AUDIO MEMORY WITH SINGLE ACTION SINGLE CONTROL

Mark P. David, 1700 Dover Rd., Apt., 108A, Delray Beach, Fla. 33445

Filed Aug. 27, 1990, Ser. No. 573,259

Int. Cl.[5] G10L *3/00*; G09B *7/02*

U.S. Cl. 381—51 **20 Claims**



1. A small light-weight memory device to supplement short-term memory that can be easily worn and operated by an unskilled or infirm user, said device having a first, recording mode for recording a brief spoken message and a second, playback mode for reproducing said message in audible form, said device comprising:

a) microphone means for transforming said spoken message to an electrical input signal;

b) recording means connected to said microphone means for storing said input signal in the form of a stable message record;

c) reproducing means connected to said recording means for converting said message record into an electrical output signal;

d) loudspeaker means connected to said reproducing means for transforming said output signal into an audible form;

e) a single manual actuating means operable by a same single motion of said user;

f) control means connected to said recording means and said reproducing means and also connected to said actuating means, said control means initiating said first, recording mode for a brief time period every other time said control

means is actuated by said actuating means and initiating said second, playback mode for a brief time interval every other time said control means is actuated by said actuating means so that the same actuating means alternately initiates recording and playback intervals when actuated by said same single motion of said user; and

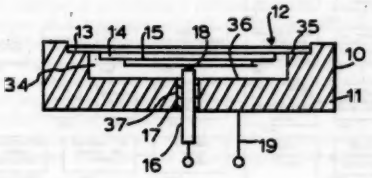
g) a protective enclosure having a front face, back and sides enclosing said recording and reproducing means, said manual actuating means being mounted upon said front face for enhanced operation, and said front face being limited to supporting said single manual actuating means as the only manually operable device thereon for ease of operation by handicapped users.

5,161,200

MICROPHONE

Keith Barr, Los Angeles, Calif., assignor to Alesis Corporation, Los Angeles, Calif.

Filed Aug. 4, 1989, Ser. No. 389,771
Int. Cl.[5] H04R *25/00*
U.S. Cl. 381—173 **16 Claims**



1. A microphone for detecting sound waves in a desired frequency range with a sensitivity that is substantially invariant over said desired frequency range comprising:

a housing having a recessed area formed therein;

sensing means for detecting said sound waves and providing a signal dependent on said sound waves, said sensing means comprising a diaphragm and a sensor, said sensing means coupled to said housing so as to form a reference air space in said recessed area between said housing and said sensing means;

said housing and said sensing means each having a resonant frequency substantially outside of said desired frequency range.

5,161,201

METHOD OF AND APPARATUS FOR MEASURING PATTERN PROFILE

Yasuhiro Kaga; Kei Hattori, both of Yokohama; Isahiro Hasegawa, Zushi, and Fumio Komatsu, Fuchu, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

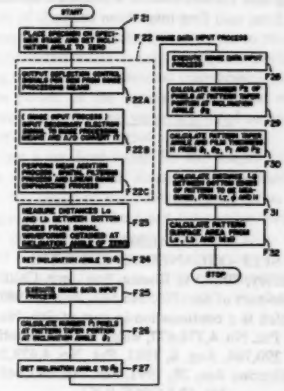
Filed Feb. 7, 1991, Ser. No. 651,796
Claims priority, application Japan, Feb. 7, 1990, 2-28012
Int. Cl.[5] G06K *9/00*; G01B *11/28*
U.S. Cl. 382—8 **3 Claims**

1. A pattern profile measuring method for measuring the profile of a measuring portion of a pattern of a specimen placed on a specimen stage by controlling a deflector of a scanning electron microscope capable of setting a desired inclination angle of one of the specimen stage and an electron optical column, applying an electron beam to the measuring portion of the specimen, and image processing a secondary electron signal from the measuring portion, said method comprising:

a first step of calculating the distance at a bottom portion of said measuring portion of said pattern by image processing said secondary electron signal when said electron beam is applied to said measuring portion at an inclination angle of zero;

a second step of obtaining a number of pixels corresponding to a taper portion width of said measuring portion of said pattern by image processing said secondary electron signal when said electron beam is applied to said measuring portion at a first predetermined inclination angle;

a third step of obtaining a number of pixels at said taper portion by image processing said secondary electron signal when said electron beam is applied to said measuring portion at a second predetermined inclination angle different from said first inclination angle;



a fourth step of calculating the taper angle and depth of said pattern in accordance with the number of pixels of the taper portion obtained at said second and third steps and the first and second predetermined inclination angles; and

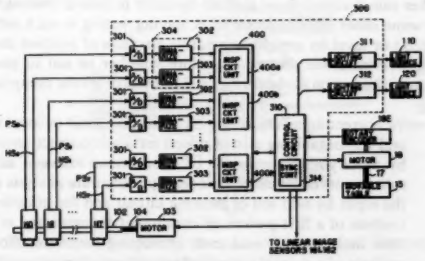
a fifth step of obtaining the profile of said taper portion in accordance with a change in strength of said second electron signal from said taper portion.

5,161,202

METHOD OF AND DEVICE FOR INSPECTING PATTERN OF PRINTED CIRCUIT BOARD

Ryuji Kitakado; Hironobu Yano, and Tetsuo Hoki, all of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co. Ltd., Japan

Filed Jul. 16, 1991, Ser. No. 731,851
Claims priority, application Japan, Jul. 18, 1990, 2-191343
Int. Cl.[5] G06K *9/00*
U.S. Cl. 382—8 **26 Claims**



1. A method of inspecting a printed board comprising an insulating board having a surface on which a conductive pattern is formed and through which a plurality of through holes extend, wherein said plurality of through holes includes a first type through hole having a first diameter and a second type through hole having a second diameter larger than said first diameter, said method comprising the steps of:

(a) obtaining images of said plurality of through holes;

(b) developing an image of said first type through hole from said images of said plurality of through holes;

(c) identifying a location of said image of said first type through hole in said surface of said printed board to obtain a first area of said surface in which said image of said first type through hole is located and a second area of said surface in which said first type through hole is not located; and

(d) inspecting said first area in a first inspection mode and inspecting said second area in a second inspection mode different from said first inspection mode.

5,161,203

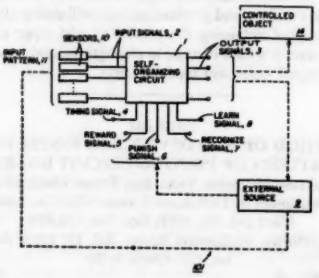
SELF-ORGANIZING CIRCUITS

B. Shawn Buckley, 7067 Via Blanca, San Jose, Calif. 95139

Continuation-in-part of Ser. No. 215,583, Jul. 6, 1988, Pat. No. 4,989,256, which is a continuation-in-part of Ser. No. 911,144, Sep. 24, 1986, Pat. No. 4,774,677, which is a continuation-in-part of Ser. No. 290,784, Aug. 6, 1981, Pat. No. 4,479,241. This application Jan. 28, 1991, Ser. No. 647,645

Int. Cl.[5] G06K *9/62*

U.S. Cl. 382—15 **16 Claims**



1. A self-organizing circuit, having a plurality of sub-circuits or levels which are connected to receive messages from some other sub-circuit or level and are operable to deliver messages to some other sub-circuit or level, having voting in each sub-circuit or level by weighting relative amounts of positive and negative influence thereto regarding whether or not to pass along information to the further sub-circuits or levels, comprising:

error correcting means acting on each sub-circuit or level of said self-organizing circuit which serves to correct errors by modifying the strength of connections between said sub-circuits or levels occasioned by inaccurate analysis of the input by said self-organizing circuit and for effecting analysis of a first pattern of constituent elements and at a later time to apply said error correcting means to effect analysis of a second pattern of constituent elements without modifying the strength of at least a portion of said connections made during said first application of error correction means;

burst function means for amplifying the influence of sub-circuits or levels which fire in short bursts and for attenuating the influence of sub-circuits or levels which fire randomly wherein the learning patterns of said self-organizing circuit are made more stable.

5,161,204

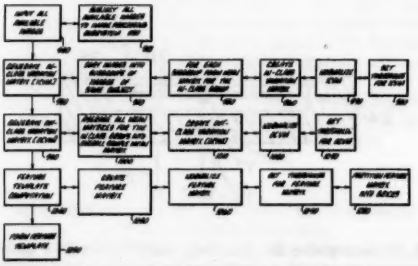
APPARATUS FOR GENERATING A FEATURE MATRIX BASED ON NORMALIZED OUT-CLASS AND IN-CLASS VARIATION MATRICES

Timothy L. Hutcheson, Los Gatos; Wilson Or, Santa Clara; Venkatesh Narayanan, Fremont; Subramaniam Mohan, Sunnyvale; Peter G. Wohlmut, Saratoga; Ramanujam Srinivasan, Sunnyvale, all of Calif.; Bobby R. Hunt, and Thomas W. Ryan, both of Tucson, Ariz., assignors to Neuristics, Inc., Milpitas, Calif.

Filed Jun. 4, 1990, Ser. No. 533,113

Int. Cl.[5] G06K *9/46, 9/66, 9/54, 9/60*

U.S. Cl. 382—16 **10 Claims**



1. A device for acquiring images, extracting image information, storing the image information, and comparing the image information with query image information comprising:

first means for acquiring images;

second means for processing said images into image information;

third means for determining the most distinctive aspects of said image information;

said third means including means for performing an In-Class to Out-of-Class study;

fourth means for forming and storing database feature vectors comprising the magnitudes of said most distinctive aspects of said image information; and

fifth means for querying said fourth means to determine whether a query feature vector is sufficiently similar to any of said database feature vectors,

wherein said means for performing an In-Class to Out-of-Class study includes:

means for generating an In-Class Variation Matrix;

means for generating an Out-Class Variation Matrix;

means for normalizing said In-Class Variation Matrix to form a normalized In-Class Variation Matrix;

means for normalizing said Out-Class Variation Matrix to form a normalized Out-Class Variation Matrix;

means for generating a feature matrix, each component of said feature matrix corresponding to a ratio between corresponding components of said normalized Out-Class Variation Matrix and said normalized In-Class Variation Matrix;

means for normalizing said feature matrix into a Normalized Feature Matrix;

means for partitioning said Normalized Feature Matrix into bricks;

means for prioritizing said bricks; and

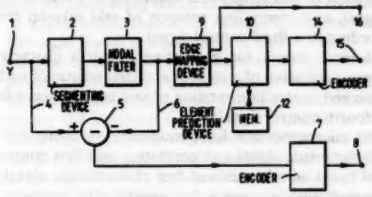
means for creating a feature template vector whose elements correspond to a subset of said bricks.

5,161,205

PROCESSING PICTURE SIGNALS

David Moran, Warrington, and Octavius J. Morris, Redhill, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 9, 1991, Ser. No. 683,351
Claims priority, application United Kingdom, Apr. 23, 1990, 9009052
Int. Cl.[5] G06K 9/36
U.S. Cl. 382—56 19 Claims



1. A method of processing a picture signal for conveyance by means of a transmission path or storage medium, said method comprising the steps of:

i) producing a picture signal which corresponds to a picture,

ii) subjecting said picture signal to a segmentation algorithm to produce a region signal which identifies edges and closed regions in said picture,

iii) producing a texture signal which corresponds to the difference between said picture signal and said region signal,

characterised in that said method comprises the further steps of:

iv) producing an edge map signal from said region signal,

v) successively scanning the elements of said edge map signal by means of a template corresponding to a fixed group of adjacent elements in a given configuration,

vi) determining the content of said fixed group of elements for each part of said successive scanning, and

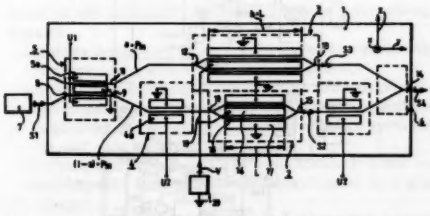
vii) predicting from each content determination the value of an additional element in a given position adjacent to but outside said fixed group of elements.

5,161,206

METHOD OF LINEARIZING A TRANSMISSION FUNCTION OF A MODULATOR ARRANGEMENT, AND A LINEARIZED MODULATOR

Anders G. Djupsjöbacka, Solna, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Oct. 2, 1991, Ser. No. 769,812
Claims priority, application Sweden, Oct. 3, 1990, 9003158
Int. Cl.[5] G02B 5/172, 6/26
U.S. Cl. 385—2 4 Claims



1. A method of linearizing a transmission function of a modulator arrangement having at least two part-modulators, each having a carrier wave input and a modulated carrier wave output and a control device for modulating a control signal and exhibiting a transmission function which deviates from a linear course, said modulator arrangement further having a connector device located between the outputs of said part-modulators, said method comprising the steps of:

applying carrier waves to said inputs of the part-modulators;

applying modulating control signals to said control devices of the part-modulators, wherein the amplitudes of the control signals are proportional to a common control signal value;

modulating the carrier waves with said control signals to produce modulated part-waves which are delivered from outputs of the part-modulators;

superimposing the modulated part-waves to produce a resultant modulated wave in said connector device;

assigning to a desired linearized transmission function relating the power of the resultant modulated wave and the common control signal value a desired mean slope which lies within a control signal value range;

establishing a smallest value for the length of a curvature radius of the desired linearized transmission function within the range of the control signal value; and

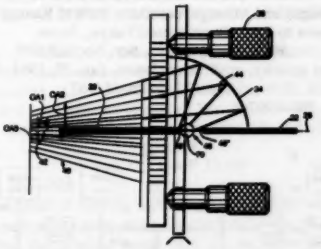
selecting a power ratio between the carrier waves delivered to the part-modulators, an amplitude ratio between the control signals of the part-modulators, and parameters of the transmission functions of the part-modulators so as to result in a curvature radius length which exceeds said smallest value.

5,161,207

OPTICAL FIBER CIRCUMFERENTIALY SYMMETRIC FUSION SPLICING AND PROGRESSIVE FIRE POLISHING

Joseph L. Pikulski, Westlake Village, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 18, 1991, Ser. No. 670,665
Int. Cl.[5] G02B 6/26
U.S. Cl. 385—96 18 Claims



17. A process for joining the ends of two optical fiber segments, comprising the steps of:

aligning two optical fiber segments in an end-to-end manner with the optical fiber segments lying along an axis;

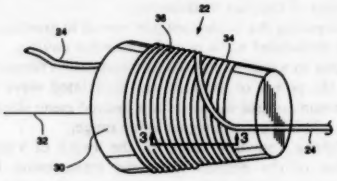
forming a converging conical light beam whose conical axis coincides with the axis of the aligned optical fiber segments and whose focal region lies on the axis of the aligned optical fiber segments; and

providing a sufficient power level to the light beam to fuse and splice the aligned ends of the optical fiber segments.

5,161,208
OPTICAL FIBER CANISTER AND PROCESS WITH OVERCOAT ADHESIVE LAYER TO PREVENT DISPENSING END BREAKS

Nancy J. Christie, and Daniel K. Schotter, both of Tucson, Ariz., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 19, 1991, Ser. No. 810,655
Int. Cl.[5] G02B *6/02*; F41G *7/00*; B65H *18/28*; B32B *31/00*
U.S. Cl. 385—128 **16 Claims**



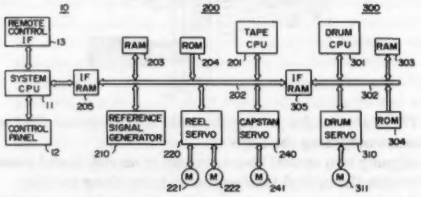
1. An optical fiber payout canister, comprising:
a bobbin having a dispensing end;
an optical fiber pack having a plurality of optical fiber layers wound upon the bobbin, the pack having a transition winding pattern between the optical fiber layers at the dispensing end thereof; and
an overcoat transition adhesive layer overlying the transition winding pattern of the optical fiber pack, the transition adhesive layer comprising from about 80 to about 72 parts by weight of a precatalyzed organofunctional siloxane polymer and from about 20 to about 28 parts by weight of a silicone elastoplastic resin.

16. A process for preparing an optical fiber payout canister, comprising the steps of:
providing a bobbin having a dispensing end;
winding a length of optical fiber onto the bobbin to form an optical fiber pack having a plurality of layers with a transition winding pattern of optical fiber extending between over-lapping portions of optical fiber layers located at the dispensing end of the bobbin;
applying a layer of winding adhesive over at least a portion of each layer of optical fiber after it is wound on the bobbin; and
applying a different, overcoat layer of transition adhesive over only the transition winding pattern of optical fiber to prevent fiber breakage during high speed payout.

5,161,209
SERVO CONTROL DEVICE FOR A VTR

Yasuo Nagai, and Mitsugu Yoshihiro, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 24, 1992, Ser. No. 825,088
Claims priority, application Japan, Jan. 30, 1991, 3-010203
Int. Cl.[5] G11B *15/467*
U.S. Cl. 388—907.5 **5 Claims**

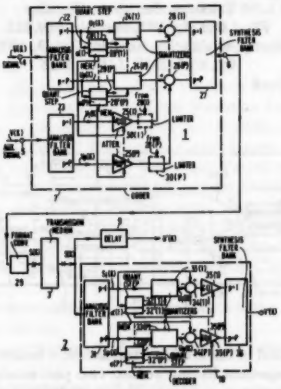


1. In an apparatus for recording and reproducing a video signal on a magnetic tape, the apparatus being operable in a plurality of modes and includinga rotary magnetic recording and reproducing head scanning the tape between supply and take-up reels on which the tape is wound, a capstan for driving said magnetic tape from said supply reel and past said rotary magnetic head to said take-up reel and means for receiving mode selecting command signals, a servo control device comprising:
first servo means for generating a first characteristic signal indicative of a rotational characteristic of said rotary magnetic head and controlling rotation of said rotary magnetic head according to a first control signal;
second servo means for generating a second characteristic signal indicative of a rotational characteristic of said supply reel and third characteristic signal indicative of a rotational characteristic of said take-up reel, controlling rotation of said supply reel according to a second control signal, and controlling rotation of said take-up reel according to a third control signal.
third servo means for generating a fourth characteristic signal indicative of a rotational characteristic of said capstan and controlling rotation of said capstan according to a fourth control signal;
a first microprocessor for periodically receiving said first characteristic signal and generating said first control signal based on said received first characteristic signal;
a second microprocessor for periodically receiving said second, third and fourth characteristic signals and generating said second , third and fourth control signals based respectively on said received second, third and fourth characteristic signals; and
control means for controlling said first and second microprocessors, so as to operate the recording and reproducing apparatus in a mode determined according to one of said mode selecting command signals.

5,161,210
CODER FOR INCORPORATING AN AUXILIARY INFORMATION SIGNAL IN A DIGITAL AUDIO SIGNAL, DECODER FOR RECOVERING SUCH SIGNALS FROM THE COMBINED SIGNAL, AND RECORD CARRIER HAVING SUCH COMBINED SIGNAL RECORDED THEREON

Willem F. Druyvesteyn; Abraham Hoogendoorn; Leon M. Van De Kerkhof, and Raymond N. J. Veldhuis, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 8, 1989, Ser. No. 433,631
Claims priority, application Netherlands, Nov. 10, 1988, 8802769; Apr. 25, 1989, 8901032
Int. Cl.[5] G10L *9/00*, *7/04*
U.S. Cl. 395—2 **14 Claims**



1. A coder for incorporating an auxiliary signal into a digital audio signal having a predetermined data format, comprising:

first analysis filter means for analyzing the frequency band of the audio signal into a plurality P of successive sub-bands so as to derive P audio signal sub-band samples;

means for quantizing the respective audio signal sub-band samples in accordance with quantizing steps based on a predetermined quantization criterion so as to derive P quantized audio signal sub-band samples, the quantizing step for each sub-band being adapted in accordance with the maximum amplitude of the signal sample in sub-band;

second analysis filter means for analyzing the auxiliary signal into said frequency sub-bands so as to derive samples thereof in one or more of such sub-bands;

means for attenuating the auxiliary sample in each sub-band to a level below that of the quantizing step employed for the audio signal in said sub-band; and

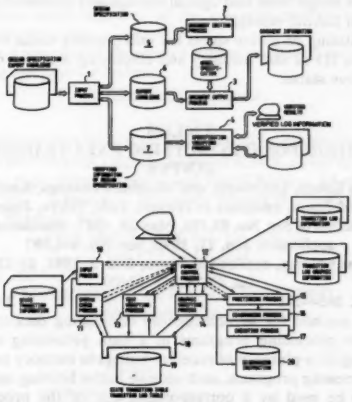
means for combining the quantized audio signal sample and attenuated auxiliary signal sample in each sub-band so as to derive a combined signal sample in each sub-band;

whereby the auxiliary signal sample included in the combined signal sample in any sub-band will be inaudible upon audio reproduction of such combined signal sample, such audio reproduction only audibly reproducing the audio signal sample included in such combined signal sample.

5,161,211
METHOD AND SYSTEM OF SPECIFICATION PROCESSING

Kouichi Taguchi, Ashigarakami, and Shinichi Yamada, Kawasaki, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 16, 1989, Ser. No. 422,039
Claims priority, application Japan, Oct. 19, 1988, 63-261495
Int. Cl.[5] G06F *15/18, 15/46*
U.S. Cl. 395—10 **3 Claims**



2. A specification processing method for outputting documents in an information processing system, comprising the steps of:

inputting design specification information as a process specification and a state transition specification;

storing said design specification as first information defining relations among processes in said process specification, and as second information defining relations among states in said state transition specification;

verifying said process and state specification in a text image;

verifying said process and state specification in a graphic image;

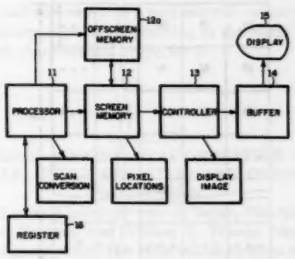
generating a command set for outputting a diagrammatical document in accordance with said process and state transition specifications; and,

editing said diagrammatical document as an edited document and outputting said edited document by executing said command set in connection with said design specification information.

5,161,212
GRAPHICS CURSOR HANDLER

James G. Littleton, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 12, 1989, Ser. No. 420,206
Int. Cl.[5] G06F *15/20*
U.S. Cl. 395—118 **42 Claims**



25. A computer system for computer graphics and using a cursor comprising:

a processor;

screen memory connected to said processor and having data including a cursor-free image background where the cursor is to be;

a video buffer connected to said screen memory; and

a display controller connected to said screen memory and to said video buffer,

wherein said processor is programmed with a drawing routine and programmed to halt said drawing routine during a frame scan, any time before the line by line scan reaches the line corresponding to the top of said cursor in said screen memory, to save the cursor-free image background of the cursor, to place data representation of the cursor in the screen memory, to determine a cursor violation region, and to permit said drawing routine to continue for so long as said drawing routine does not attempt to write to a pixel protected by said cursor violation region.

5,161,213
METHOD FOR BLACK AND WHITE IMAGE REDUCTION BASED UPON AVERAGING BLACK/WHITE PIXEL COUNTS OF NEIGHBORING BLOCKS

Kenneth C. Knowlton, Merrimack, N.H., assignor to Wang Laboratories, Inc., Lowell, Mass.

Continuation of Ser. No. 245,419, Sep. 16, 1988, abandoned, which is a continuation-in-part of Ser. No. 200,091, May 27, 1988, abandoned. This application Mar. 18, 1991, Ser. No. 671,639
Int. Cl.[5] G06F *15/68*
U.S. Cl. 395—128 **8 Claims**

1. A method of making a reduced image of an original x by y black and white pixel image comprising steps of:

dividing the original image into blocks, each block corresponding to a pixel in the reduced image;

for each block of the image, counting the number of black pixels to get a black count and the number of white pixels to get a white count; and

for each block not on the border of the original image:

determining the average black count in the blocks adjacent said block;

comparing the black count of said block with said average black count;

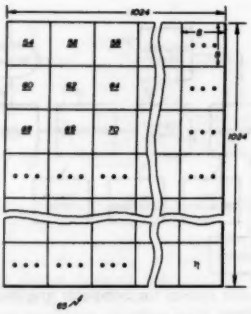
if the black count of the block is greater than the average

black count by a first predetermined amount, making the corresponding pixel of the reduced image black;

determining the average white count in the blocks adjacent said block;

comparing the white count of said block with said average white count;

if the white count of the block is greater than the average white count by a second predetermined amount, making the corresponding pixel of the reduced image white;



if neither said block white or black count is greater than the corresponding average by said first and second predetermined amounts, respectively, determining the corresponding reduced image pixel color based on the number of black and white pixels in said block; and

storing the color of that pixel as an element of the reduced image.

5,161,214

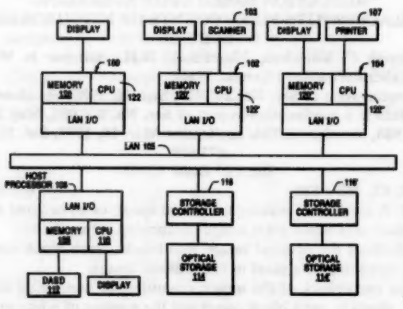
METHOD AND APPARATUS FOR DOCUMENT IMAGE MANAGEMENT IN A CASE PROCESSING SYSTEM

Marvin Addink, Sioux Falls, S. Dak.; Cheney Y. Hu, Germantown; Todd Leyba, Gaithersburg, both of Md.; John J. Mullen, Purcellville, Va.; Carolyn A. Till, Gaithersburg, and Andrew W. Holmes, Bethesda, both of Md., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 28, 1990, Ser. No. 573,942

Int. Cl.[5] G06F *3/14*

U.S. Cl. 395—145 **4 Claims**



1. In a digitized document image storage and retrieval system, for storing document images organized into a plurality of cases having a common case format defining a plurality of document types required in each case, a method for managing the storage of digitized documents comprising the steps of:

receiving a first document image having a first document type and inputting an identifier and first document type characterization to said system and assigning a first document ID thereto;

deriving a case ID from said identifier;

storing said first document image on a DASD storage device and on an optical storage device;

storing said first document ID and an address of said first image in said optical storage, in a document file in a memory in said system and cross referencing said first document ID with said case ID;

inputting a pend command and a second document type characterization to said system, to remove said first document image from said DASD storage device until said system receives a document image having a second document type for said case ID, and storing a pending status for said case ID in said memory;

storing said case ID and said second document type characterization in a case pending file in said memory;

deleting said first document image from said DASD storage device;

receiving a second document image having said second document type and inputting said identifier and second document type characterization to said system and assigning a second document ID thereto;

storing said second document image on said DASD storage device;

storing said second document ID and an address of said second image in said DASD storage, in said memory in said system and cross referencing said second document ID with said case ID;

accessing said case pending file in said memory to determine whether said case ID is stored therein;

comparing said second document type characterization stored in said case pending file with said second document type characterization inputted with said step of receiving said second image, and in response thereto, accessing said first image from said optical storage and transferring it to said DASD storage;

substituting an active status for said pending status for said case ID in said memory and displaying a notice of said active status.

5,161,215

METHOD FOR CONTROLLING DATA TRANSFER BUFFER

Katsuya Kouda, Yokohama, and Masaharu Iwanaga, Kamakura, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 55,181, May 28, 1987, abandoned. This application Jan. 11, 1990, Ser. No. 464,587

Claims priority, application Japan, Jun. 2, 1986, 61-125725

Int. Cl.[5] G06F *13/00*

U.S. Cl. 395—250 **2 Claims**

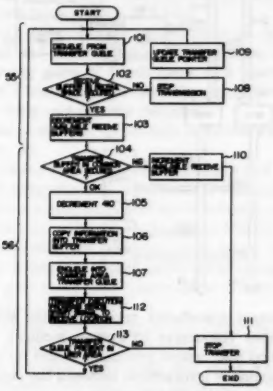
1. A method for asynchronously controlling data transfer between processing programs in a data processing system including (i) a plurality of receiver buffers in memory areas of the processing programs, each receive buffer holding received data to be used by a corresponding one of the processing programs, (ii) a transfer buffer connected with said processing programs such that data is transferred from a first processing program with data to send to said transfer buffer and from the transfer buffer to the receive buffer of a designated other processing program, and (iii) a counter means containing a count initially set to a number of receive buffers provided in each memory area for indicating availability of the receive buffers corresponding to each processing program to receive data, said method comprising the steps of:

a) in response to one of the processing programs having data to send to a designated destination processing program, with the one data sending processing program accessing said counter means and reading the contained count indicative of the number of available receive buffers corresponding to the designated destination processing program,

b) with the one data sending processing program, determin-

ing whether the at least one receive buffer corresponding to the designated destination processing program is available,

c) in response to the at least one receive buffer corresponding to the designated destination processing program being indicated as available, transferring the data to be sent to the designated destination processing program from the one data sending processing program to said transfer buffer,



d) transmitting the data stored in said transfer buffer from the transfer buffer to the at least one of the available receive buffers corresponding to the designated destination provessing program and decrementing said counter means each time one of the available receive buffer is occupied and,

e) each time one of the receive buffers is released, incrementing the counter means.

5,161,216

INTERPROCEDURAL SLICING OF COMPUTER PROGRAMS USING DEPENDENCE GRAPHS

Thomas Reps; Susan Horwitz, and David Binkley, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

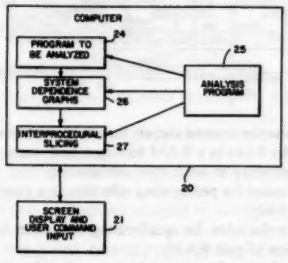
Filed Mar. 8, 1989, Ser. No. 324,321

Int. Cl.[5] G06F *9/45*

U.S. Cl. 395—375 **1 Claim**

MICROFICHE APPENDIX INCLUDED

(3 Microfiche, 123 Pages)



1. A method carried out by a digital computer for constructing a system dependence graph for a computer program system having multiple procedures, comprising the steps of:

(a) for each procedure of the system, constructing its procedure dependence graph;

(b) for each call site in the program, introducing a call edge from the call-site vertex to the corresponding procedure entry vertex;

(c) for each preprocessing vertex v at a call site, introducing a linkage—entry edge from v to the corresponding initialization vertex in the called procedure;

(d) for each post processing vertex v at a call site, introducing a linkage-exit edge to v from the corresponding finalization vertex in the called procedure;

(e) constructing the linkage grammar corresponding to the system;

(f) computing subordinate characteristics graphs of the linkage grammar's nonterminals; and

(g) at all call sites that call a procedure P, introducing flow dependency edges corresponding to the edges in the subordinate characteristic graph for P.

5,161,217

BUFFERED ADDRESS STACK REGISTER WITH PARALLEL INPUT REGISTERS AND OVERFLOW PROTECTION

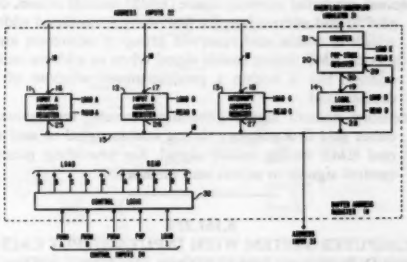
Richard A. Lemay, Carlisle; Steven A. Tague, Billerica; Kenneth J. Izbicki, Hudson, and William E. Woods, Natick, all of Mass., assignors to Bull HN Information Systems Inc., Billerica, Mass.

Continuation of Ser. No. 300,732, Jan. 23, 1989, abandoned, and a continuation of Ser. No. 918,227, Oct. 14, 1986, abandoned.

This application Oct. 6, 1989, Ser. No. 418,084

Int. Cl.[5] G06F *9/22, 12/00*

U.S. Cl. 395—375 **4 Claims**



1. A buffer address register for storing multiple-bit addresses from a plurality of multiple-bit address sources and for redelivering said addresses to a common address output on a last-in, first-out basis, said buffer address register comprising, in combination,

a plurality of multiple-bit local input registers each having an input connected to one of said plurality of address sources and each having an output connected to said common address output,

a local multiple-bit stack-output register having an input and having an output directly connected to said common address output,

a pop-stack register having plural multiple-bit storage locations, having an input connected to said common address output, and having an output connected to the input of said local stack-output register, and

control logic responsive to a command to push a new address from one of said plurality of address sources address for transferring any previously pushed address stored in one of said local input registers to the input of said pop-stack register via said common address output and for thereafter storing said new address in one of said local input registers.

5,161,218

MEMORY CONTROLLER FOR USING RESERVED DRAM ADDRESSES FOR EMS

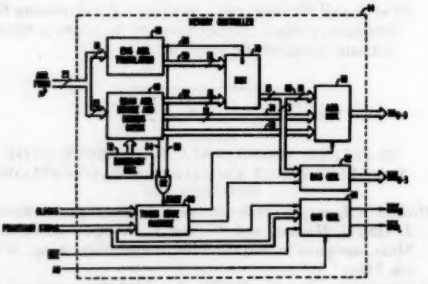
Robert W. Catlin, Santa Clara, Calif., assignor to Chips and Technologies, Inc., San Jose, Calif.

Continuation of Ser. No. 435,323, Nov. 13, 1987, Pat. No. 4,985,871. This application Nov. 13, 1990, Ser. No. 614,183

The portion of the term of this patent subsequent to Aug. 18, 2009, has been disclaimed.

Int. Cl.[5] G06F *12/00, 12/10*; G11C *8/00*

U.S. Cl. 395—425 **9 Claims**



1. A memory control circuit for controlling access to a memory, comprising:

first memory decodes means, coupled to an address bus, for providing a first memory timing enable signal when an address on said address bus is within a first predetermined range of addresses and is not within a reserved group of addresses within said first range of addresses;

second expanded memory space (EMS) decode means, coupled to said address bus, for providing a translated address which is within said reserved group of addresses and a second EMS timing enable signal when an address on said address bus is within a predetermined window of addresses; and

memory control signal generation means, responsive to either said first memory timing enable signal or said second EMS timing enable signal, for providing memory control signals to access said memory.

5,161,219

COMPUTER SYSTEM WITH INPUT/OUTPUT CACHE

James O. Nicholson; John C. O'Quin, III; John T. O'Quin, II, and Frederick E. Strietelmeier, all of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 297,775, Jan. 13, 1989, abandoned. This application May 31, 1991, Ser. No. 711,343

Int. Cl.[5] G06F *12/00, 13/00*

U.S. Cl. 395—425 **3 Claims**

1. A computer system, comprising:

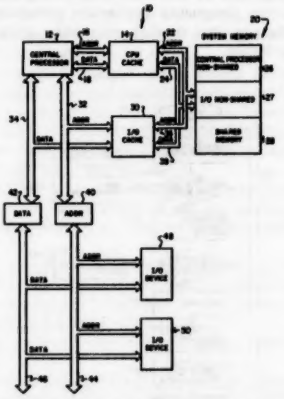
central processor means for initiating system memory transactions;

a system memory including a central processor non-shared region, an input/output non-shared region, and a shared region;

central processor cache means, connected to said central processor means and to the system memory and responsive to system memory transactions initiated by the central processor means, for executing system memory transactions between the central processor means and the central processor non-shared region of said system memory and for caching all memory accesses to the central processor non-shared region;

input/output means for initiating system memory transactions; and

input/output cache means, connected to said input/output means, to the central processor means and to said system memory, and responsive to memory transactions initiated by the input/output means for executing all system memory transactions between the input/output means and the



input/output non-shared region and the shared region, and further responsive to system memory transactions initiated by said central processor means for executing all system memory transactions between the central processing means and the shared region.

5,161,220

DATA WRITE CONTROL CIRCUIT HAVING WORD LENGTH CONVERSION FUNCTION

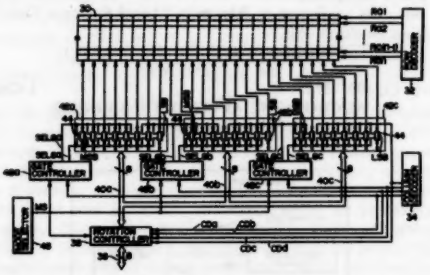
Yoshitaka Watanabe, Ooita, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 25, 1990, Ser. No. 542,599

Claims priority, application Japan, Jun. 26, 1989, 1-163194

Int. Cl.[5] G06F *7/00, 9/15*

U.S. Cl. 395—425 **7 Claims**



1. A data write control circuit for continuously writing 6-bit data given by 8 bits in a RAM having a first, second, and third 8-bit column array in each row, comprising:

a row decoder for performing selection in a row direction of said RAM;

a column decoder for performing selection in a column direction of said RAM;

a mode selector for outputting a mode selection signal for performing selection between an 8-bit write mode and a 6-bit write mode;

an 8-bit common data bus for carrying 8-bit data to be written in said RAM;

a rotation controller for performing bit rotation in units of 2

bits for the 8-bit data supplied from said 8-bit common data bus in correspondence with the mode selection signal and a column selection state of said column decoder and for outputting the 8-bit data;

first, second, and third 8-bit data buses for supplying the 8-bit data output from said rotation controller;

a first I/O gate block connected between said first 8-bit data bus and said first 8-bit column array of said RAM and having gates of 8 bits;

a second I/O gate block connected between said second 8-bit data bus and said second 8-bit column array of said RAM and having gates of 8-bits;

a third I/O gate block connected between said third 8-bit data bus and said third 8-bit column array of said RAM and having gates of 8-bits, gates of 6 lower bits of said gates of 8 bits being activated by a predetermined decode output from said column decoder;

a first gate controller, selectively activated by said column decoder, for

(a) activating all of said gates of 8-bits in said first I/O gate block when the 8-bit write mode is selected by the mode selection signal from said mode selector, and

(b) activating only gates of 6 upper bits of said gates of 8-bits in said first I/O gate block when the 6-bit write mode is selected by the mode selection signal;

a second gate controller, selectively activated by said column decoder, for

(a) activating all of said gates of 8 bits in said second I/O gate block when the 8-bit write mode is selected by the mode selection signal from said mode selector, and

(b) activating only gates of 2 lower bits of said gates of 8 bits in said first I/O gate block and gates of 4 upper bits of said gates of 8 bits in said second I/O gate block when the 6-bit write mode is selected by the mode selection signal; and

a third gate controller, selectively activated by said column decoder, for

(a) activating all of said gates of 8 bits in said third I/O gate block when the 8-bit write mode is selected by the mode selection signal from said mode selector, and

(b) activating only gates of 4 lower bits of said gates of 8 bits in said second I/O gate block and gates of 2 upper bits of said gates of 8 bits in said third I/O gate block when the 6-bit write mode is selected by the mode selection signal.

5,161,221

MULTI-MEMORY BANK SYSTEM FOR RECEIVING CONTINUOUS SERIAL DATA STREAM AND MONITORING SAME TO CONTROL BANK SWITCHING WITHOUT INTERRUPTING CONTINUOUS DATA FLOW RATE

Scott L. Van Nostrand, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 12, 1988, Ser. No. 282,714

Int. Cl.[5] G11C *8/00*

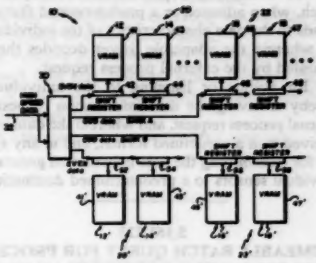
U.S. Cl. 395—425 **14 Claims**

1. Apparatus for handling high speed data, said apparatus comprising:

a first memory bank having a plurality of memory arrays for storing data therein;

a second memory bank having a plurality of memory arrays for storing data therein; and

control means operatively coupled to said memory banks for receiving a continuous stream of data in serial form and for directing said data to a selected one of said banks and to a selected array in the selected one bank for storage therein, said control means including means for monitoring the number of elements of data in the selected one bank and means for generating a signal when the number of elements of data in the selected one bank have reached a predetermined level, and said control means further including means responsive to said signal for changing the stream of data from the selected one bank to the other



bank without interrupting the rate of continuous flow thereof.

5,161,222

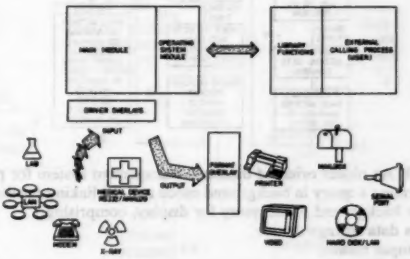
SOFTWARE ENGINE HAVING AN ADAPTABLE DRIVER FOR INTERPRETING VARIABLES PRODUCED BY A PLURALITY OF SENSORS

Leopoldo S. Montejo, and Martine Pean, both of Paris, France, assignors to Human Microprocessing, Inc., Milwaukee, Wis.

Filed Aug. 20, 1990, Ser. No. 569,857

Int. Cl.[5] G06F *13/14*

U.S. Cl. 395—500 **14 Claims**



1. A software engine for interpreting variables produced by a plurality of sensors which communicate by means of serial, analog or local area network protocols, the software engine comprising:

means for interpreting an external process request for data information which includes the variable produced by the sensor, and wherein the external process request is an independently executable software program which includes a piece of software code which generates a message in a predetermined format requesting from the software engine the delivery of data which is in a specific format and syntax, and wherein the independently executable software program in otherwise unfamiliar with the software engine and which further includes:

a. means for interfacing with an operating system to determine if an appropriate operating system is present and to execute the necessary memory and disk management functions such that the software engine can operate, the software engine otherwise being operating system independent, and wherein the interface means is included in a main module;

b. means for creating a mailbox which is adapted to exchange information with the external process request, and

c. means for opening an object queue loop, and wherein

the object queue loop identifies an object type and initiates a predetermined process with the individual sensors requested by the external process;

means for overlaying a predetermined adaptable driver, which, when adjusted in a predetermined fashion, corresponds to the data characteristics of the individual sensors and wherein the adaptable driver decodes the variables requested by the external process request;

means for polling or listening to the individual sensors, thereby receiving the data information requested by the external process request, and wherein the data information received is in a predefined format, and in any syntax; and

means for transmitting the data information generated by the individual sensors to a predetermined destination.

5,161,223

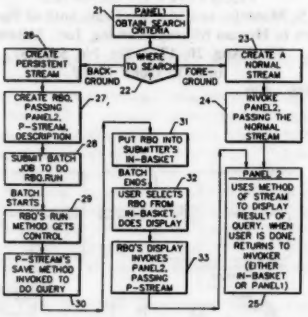
RESUMEABLE BATCH QUERY FOR PROCESSING TIME CONSUMING QUERIES IN AN OBJECT ORIENTED DATABASE MANAGEMENT SYSTEM

Robert L. Abraham, Marietta, Ga., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 23, 1989, Ser. No. 425,829

Int. Cl.[5] G06F *15/40*

U.S. Cl. 395—600 **17 Claims**


PANEL1
OBTAIN SEARCH CRITERIA
WHERE TO SEARCH ?
BACK-GROUND
FORE-GROUND
CREATE PERSISTENT STREAM
CREATE A NORMAL STREAM
CREATE RBO, PASSING PANEL2, P-STREAM, DESCRIPTION
INVOKE PANEL2, PASSING THE NORMAL STREAM
SUBMIT BATCH JOB TO DO RBO.RUN
PUT RBO INTO SUBMITTER'S IN-BASKET
BATCH STARTS
BATCH ENDS
RBO'S RUN METHOD GETS CONTROL
USER SELECTS RBO FROM IN-BASKET, DOES DISPLAY
PANEL 2
USES METHOD OF STREAM TO DISPLAY RESULT OF QUERY. WHEN USER IS DONE, RETURNS TO INVOKER (EITHER IN-BASKET OR PANEL1)
P-STREAM'S SAVE METHOD INVOKED TO DO QUERY
RBO'S DISPLAY INVOKES PANEL2, PASSING P-STREAM

1. An object oriented database management system for performing a query in background mode and for linking results of the background mode query for display, comprising:

a data storage device;

input means;

display means;

a database of data objects stored in said data storage device;

a data processor connected to said data storage device;

incoming message indicating means executing in said data processor for displaying an incoming message indicator on display means;

a first dialog executing in said data processor, for accepting information from said input means regarding a query to be performed on said database;

means executing in said data processor, and responsive to said first dialog, for determining that said query is to be performed in background mode;

means, executing in said data processor, and responsive to said determining means, for performing said query on said database in background mode to produce a stream, said stream comprising an object having a plurality of stream attributes including a list of data objects which result from said query performed in background mode;

a second dialog executing in said data processor, for displaying said stream on said display means;

a resumeable batch query object executing in said data processor for linking said second dialog and said stream, said resumeable batch query object including resumeable batch query attributes and at least one resumeable batch query method, said resumeable batch query attributes comprising an identifier of said second dialog and an identifier of said stream produced by said query performed in background mode; and

means, executing in said data processor, for providing said resumeable batch query object to said incoming message indicating means, to notify said incoming message indicating means that said query has been performed.

5,161,224

LIST TYPE DATA STORING AND RETRIEVING SYSTEM

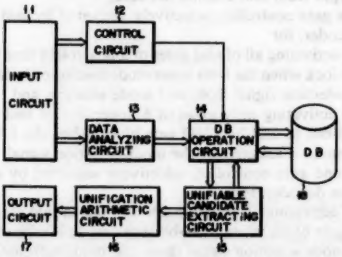
Hideyuki Tsutsumitake, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 18, 1989, Ser. No. 353,549

Claims priority, application Japan, May 20, 1988, 63-123524

Int. Cl.[5] G06F *15/40*

U.S. Cl. 395—600 **12 Claims**



1. A list type data storing and retrieving system comprising:

input means for inputting list type data to be retrieved;

analyzing means for analyzing a structure of the list type data having symbols and appearance position data of each of the symbols and outputting the symbols and the appearance position data;

storage means for storing the appearance position data output from said analyzing means, symbols respectively assigned to the appearance position data, and at least one identifier set for the symbols assigned to the appearance position data; and

retrieval means for reading out one of a set of identifiers including the same symbols and position data as symbols and position data contained in list type data to be retrieved and a set of identifiers including variable symbols in position data having a higher order than that of the position data, from said storage means with respect to all symbols constituting the input list type data, and outputting list type data specified by identifiers common to all the symbols as unifiable candidates.

5,161,225

PERSISTENT STREAM FOR PROCESSING TIME CONSUMING AND REUSABLE QUERIES IN AN OBJECT ORIENTED DATABASE MANAGEMENT SYSTEM

Robert L. Abraham, and Michael P. Priven, both of Marietta, Ga., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 23, 1989, Ser. No. 425,747

Int. Cl.[5] G06F *15/40*

U.S. Cl. 395—600 **25 Claims**

1. An object oriented database management system comprising:

a data storage device;

a database of data objects stored in said data storage device;

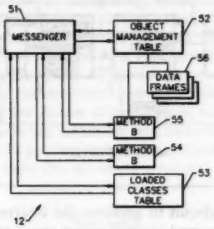
a data processor connected to said data storage device;

an object oriented database manager operating in said data processor, for performing queries of said database of data objects, said database manager including a stream class and a persistent stream class of objects;

said stream class of objects comprising a plurality of stream

class attributes and at least one stream class method, said stream class attributes comprising a list of data objects which result from a query performed by said object oriented database manager; and

said persistent stream class of objects comprising a plurality of persistent stream class attributes and at least one persistent stream class method, said persistent stream class being



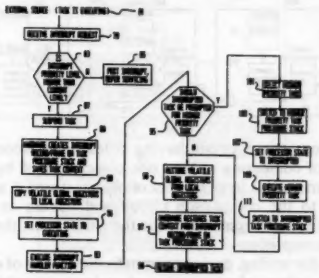
organized as a subclass of said stream class to thereby inherit said stream class attributes and said at least one stream class method, said at least one persistent stream class method further comprising a save method for saving the list of data objects which result from a query performed by said object oriented database manager in said data storage device.

5,161,226

MICROPROCESSOR INVERSE PROCESSOR STATE USAGE

Susan E. Wainer, Lower Gwynedd, Pa., assignor to JMI Software Consultants Inc., Springhouse, Pa.

Filed May 10, 1991, Ser. No. 698,077
Int. Cl.[5] G06F 9/46
U.S. Cl. 395—650 **6 Claims**



1. A method of "inside-out", inverse operation of operating a multi-tasking, interrupt capable microprocessor system having a user memory stack, an interrupt stack, an interrupt handler mechanism, a register set, and a process-controls register with a state bit defining the operational state of said microprocessor and designating an execute state and an interrupt state, and is comprised of the following steps:

entering a user task;

setting said state bit to the inverse value of the microprocessor architecture defined execute state;

executing said user task including establishing a user task procedure stack;

receiving an interrupt request of higher priority than the current processor interrupt level;

suspending said user task execution;

having interrupt record and frame containing user task context automatically stored in said task procedure stack, thereby preventing the microprocessor architecture defined switch to said interrupt stack;

storing volatile global registers in local registers, which are dedicated to the current interrupt frame;

setting said state bit to the inverse value of the microprocessor architecture defined interrupt state;

servicing said interrupt by operating out of said interrupt frame on said user procedure stack;

restoring volative global registers from local registers;

having said user task context, which includes the inverse value of said state bit, automatically restored from said task procedure stack; and

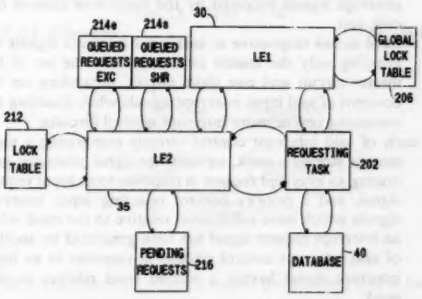
resuming execution of said interrupted user task.

5,161,227

MULTILEVEL LOCKING SYSTEM AND METHOD

Daniel M. Dias, Mahopac, N.Y.; Balakrishna R. Iyer, Fremont, Calif., and Philip S. Yu, Chappaqua, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 13, 1989, Ser. No. 434,649
Int. Cl.[5] G06F 13/376
U.S. Cl. 395—650 **11 Claims**



1. In a computer system including means for executing a plurality of tasks in parallel and a shared resource which may be accessed by any of the plurality of tasks, wherein access to the shared resource is controlled by requests from the plurality of tasks for a mode of access from a set of predetermined modes of access, a method for managing the requests, said method comprising the steps of:

a) receiving, at a first level access manager directly accessible by all of said plurality of tasks, a request from one of said plurality of tasks for access to the shared resource in a given mode, wherein said given mode is one of said predetermined modes;

b) checking the received request for compatibility with a currently allowed mode of access to the shared resource;

c) sending a message to the one task granting or denying the request if the request is found to be respectively compatible or incompatible in step b); and

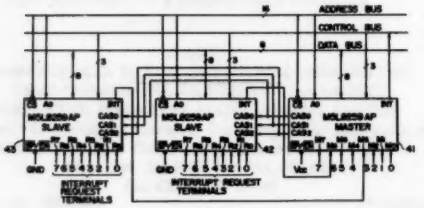
d) sending a further request from the one task to a second level access manager to which the shared resource has been assigned and which is directly accessible only by selected ones of said plurality of tasks, for access in the given mode if the request is found to be incompatible at step b).

5,161,228

SYSTEM WITH SELECTIVELY EXCLUSIONARY ENABLEMENT FOR PLURAL INDIRECT ADDRESS TYPE INTERRUPT CONTROL CIRCUIT

Takashi Yasui, Kobe; Masanobu Fukushima, Toyonaka, and Kazuhiko Hara, Takatsuki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 2, 1989, Ser. No. 317,808
Claims priority, application Japan, Mar. 2, 1988, 63-48957
Int. Cl.[5] G06F *9/46*
U.S. Cl. 395—725 **4 Claims**



1. An interrupt control system comprising:

a plurality of interrupt control circuits comprising a master interrupt control circuit and at least one slave interrupt control circuit connected to said master circuit, each control circuit receiving a respective plurality of input interrupt signals and each interrupt control circuit including its own respective interrupt vector table for generating vector addresses corresponding to respective input interrupt signals received by the respective control circuit; and

control means responsive to said input interrupt signals for enabling only the master circuit or only the set of the master circuit and one slave circuit, depending on the contents of said input interrupt signals while disabling the remaining one or more interrupt control circuits;

each of said interrupt control circuits comprising a mask storage storing a mask, an interrupt signal generator generating an interrupt request in response to an input request signal, and a priority control rejecting input interrupt signals which have a first level relative to the mask when an interrupt request signal has been generated by another of said interrupt control circuits in response to an input interrupt signal having a second level relative to said mask.

5,161,229

CENTRAL PROCESSING UNIT

Takashi Yasui, Toyonaka; Keiichi Yoshioka, Sanda, and Shinichi Yamaura, Takarazuka, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 5, 1990, Ser. No. 533,383
Claims priority, application Japan, Jun. 9, 1989, 1-148064
Int. Cl.[5] G06F *9/30, 9/302, 9/46*
U.S. Cl. 395—775 **2 Claims**

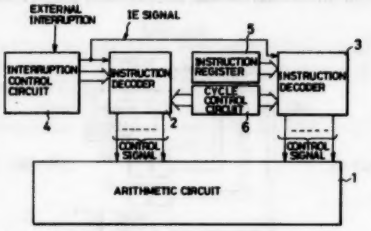
1. A central processing unit comprising:

an arithmetic circuit for performing an arithmetic processing;

an interruption control circuit for outputting an interruption control signal for an interruption processing on the basis of an external interruption signal inputted thereto;

a first control means connected to said interruption control circuit and said arithmetic circuit for controlling operations of said arithmetic circuit so as to cause said arithmetic circuit to perform the arithmetic processing when said first control means does not receive the interruption control signal from said interruption control circuit and to prevent a performing of the arithmetic processing when said first control means receives the interruption control signal from said interruption control circuit; and

a second control means connected to said interruption control circuit and said arithmetic circuit for controlling operations of said arithmetic circuit so as to cause said



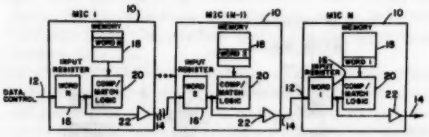
arithmetic circuit to perform the interruption processing when said second control means receives the interruption control signal from said interruption control circuit and to prevent a performing of the interruption processing when said second control means does not receive the interruption control signal from said interruption control circuit.

5,161,230

MULTIFIELD IDENTIFICATION CIRCUIT AND RELATED METHOD OF OPERATION

Jeffery A. Carter, Manhattan Beach; Peggy M. Otsubo, Redondo Beach; Kenneth N. Gravenstede, Lawndale, and Robert A. Grotz, Palos Verdes Estates, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Jun. 5, 1987, Ser. No. 58,475
Int. Cl.[5] G06F *15/00*
U.S. Cl. 395—800 **11 Claims**



1. A comparison circuit having at least one processing cell capable of comparing at least one object defined by multiple parameters, with a large number of objects stored in a data base external to the comparison circuit and having an identical structure but different values for the parameters, the processing cell comprising:

means for storing, during an initialization mode of operation, data values of parameters of at least one object to be compared with objects in the data base, wherein each stored parameter takes the form of a range of values specified by a maximum value and a minimum value;

means for inputting during an identification mode of operation following the initialization mode, a stream of data values of parameters of multiple objects stored in the data base, wherein each parameter is defined as a range of values specified by a maximum value and a minimum value, wherein the means for inputting the stream of data values includes an input register for temporary storage of the stream of data values;

means for comparing, during the identification mode of operation, each parameter of the stored object with the corresponding parameter of each of the multiple objects streamed into the processing cell and temporarily stored in the input register;

means for outputting, during the identification mode of operation, the stream of data values from the processing cell in the same form in which they were input; and

means for outputting, during the identification mode of operation, match signals indicative of matches detected between the stored object and objects streamed through the processing cell, wherein a match is defined as a condition in which every parameter of the stored object has a range of values that overlaps the range of values of the corresponding parameter of an object streamed through the processing cell,

wherein the means for comparing includes:

means for comparing the minimum value of a stored parameter with the maximum value of each corresponding parameter of the stream of data values; and

means for comparing the maximum value of the stored parameter with the minimum value of each corresponding parameter of the stream of data values, wherein a match is declared unless the maximum and minimum stored values are either both greater than the maximum streamed value of both less than the minimum streamed value.

5,161,231

PROCESSING SYSTEM WHICH TRANSMITS A PREDETERMINED ERROR CODE UPON DETECTION OF AN INCORRECT TRANSMISSION CODE

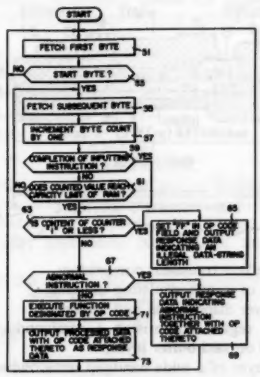
Yasuo Iijima, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 361,349, Jun. 5, 1989, abandoned, which is a continuation of Ser. No. 97,660, Sep. 16, 1987, abandoned. This application Mar. 12, 1991, Ser. No. 667,376

Claims priority, application Japan, Sep. 27, 1986, 61-229149; Nov. 14, 1986, 61-271207

Int. Cl.[5] H04L *13/00*; **G06F** *11/00, 11/14*

U.S. Cl. 395—800 **6 Claims**



1. A data transmission system in which in IC card accepting device sends instruction data to an IC card, the instruction data including in an instruction code field which includes at least a function code in a function code field indicating a content of processing, and said IC card returning the function code in a received instruction data back to said IC card accepting device, wherein said IC card includes:

means for receiving the instruction data;

means for checking contents of said instruction code field to determine whether the function code is a preliminarily registered function code;

first returning means for setting the function code in the function code field and for returning the function code field to said IC card accepting device, only when said checking means indicates that the function code is the preliminarily registered function code; and

second returning means for setting data in the function code field indicating that the function code in the instruction data received by said receiving means is not the registered function code, and for returning the instruction code field to said IC card accepting device, only when said checking means indicates that the function code is not the registered function code and wherein said IC card accepting device includes:

means for receiving the data indicating that the function code is not sent by said second returning means; and

means for in response to the function code resending the instruction data to said IC card.

5,161,232

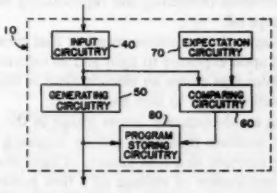
MODULAR SELF-PROGRAMMER

James T. Beran, 2101 California St., Apt. 104, Mountain View, Calif. 94040

Continuation of Ser. No. 776,819, Sep. 17, 1985, abandoned. This application Mar. 12, 1992, Ser. No. 850,214

Int. Cl.[5] G06F *15/00*

U.S. Cl. 395—800 **28 Claims**



18. A machine comprising a master programmer and at least one servant programmer, the master programmer and each servant programmer comprising:

input means for receiving input signals, each input signal being one of a plurality of possible input signals;

signal providing means for providing a signal indicating at least one of the possible input signals;

comparing means for comparing the input signals with the signal indicating at least one of the possible input signals and for providing a comparison signal when an input signal is received that is indicated by the indicating signal;

output providing means responsive to the input signals received by the input means for providing a sequence of output signals, the sequence including a plurality of steps; and

storing means for storing data corresponding to a plurality of the steps of the sequence of output signals in response to the comparison signal; the master programmer and each servant programmer being connected so that the signal providing means of each of the servant programmers provides its indicating signal based on one of the output signals from the output providing means of the master programmer and so that the comparison signal of each of the servant programmers is included in the input signals received by the input means of the master programmer.

5,161,233

METHOD FOR RECORDING AND REPRODUCING INFORMATION, APPARATUS THEREFOR AND RECORDING MEDIUM

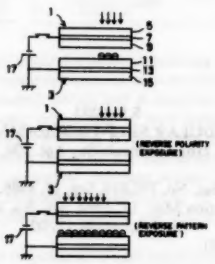
Makoto Matsuo; Minoru Utsumi; Chihaya Ogusu; Shunsuke Mukasa; Yoshiaki Kudo; Hiroyuki Obata; Takashi Aono; Hiroshi Mohri; Masato Kolke; Hideaki Amano, and Norikazu Saito, all of Tokyo, Japan, assignors to Dai Nippon Printing Co., Ltd., Tokyo, Japan

Filed May 16, 1989, Ser. No. 352,525

Claims priority, application Japan, May 17, 1988, 63-121591; May 17, 1988, 63-121593; May 17, 1988, 63-121594; May 20, 1988, 63-123600; May 20, 1988, 63-123601; May 20, 1988, 63-123602; May 26, 1988, 63-129309; May 26, 1988, 63-129310; Sep. 13, 1988, 63-230475; Sep. 13, 1988, 63-230476; Sep. 29, 1988, 63-248579; Dec. 6, 1988, 63-308159; Mar. 3, 1989, 1-51368; Mar. 3, 1989, 1-51369; Mar. 17, 1989, 1-65465; Mar. 17, 1989, 1-65469; Mar. 18, 1989, 1-66792; Mar. 18, 1989, 1-66797

Int. Cl.[5] G03G *15/044*

U.S. Cl. 355—218 9 Claims



1. An information recording and reproducing method comprising the steps of:

(a) arranging a photosensitive member that creates an electric field upon exposure to light and an information carrying medium that stores an electric field in the form of an electrostatic charge to face each other;

(b) forming an electrostatic latent image in the information carrying medium thus arranged by exposing said photosensitive member to a first pattern of light under a condition of application of voltage of a first polarity between said photosensitive member and said information carrying medium to thereby store information represented by said first pattern in said information carrying medium; and

(c) erasing the electrostatic latent image by exposing said photosensitive member to a second pattern of light representative of the same information as that of said first pattern of light.

5,161,234

HANGING ORNAMENTS FOR EYEGLASSES

Yukuo Nitta, Fukui, Japan, assignor to Seelex Kabushiki Kaisha, Fukui, Japan

Filed Dec. 27, 1990, Ser. No. 634,627

Claims priority, application Japan, May 9, 1990, 2-48877[U]

Int. Cl.[5] G02C *11/02*

U.S. Cl. 351—52 2 Claims

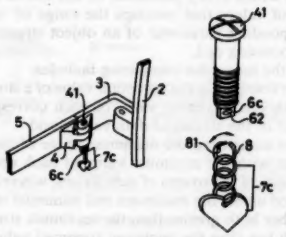
1. Hanging ornaments for eyeglasses having a pair of temple pieces and a front frame, comprising:

a pair of hinges foldably connecting the pair of temple pieces on both ends of the front frame;

shaft screw means for running through each of said pair of hinges;

a joining member having a hanging hole and connected to said shaft screw:

fastener means for attachment to said hanging hole; and



an ornament freely attached on said hanging hole via fastener means.

5,161,235

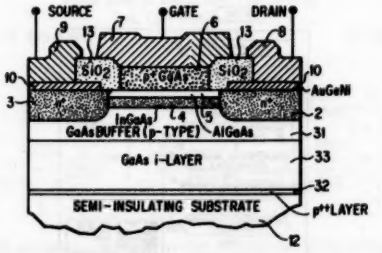
FIELD-EFFECT COMPOUND SEMICONDUCTIVE TRANSISTOR WITH GAAS GATE TO INCREASE BARRIER HEIGHT AND REDUCE TURN-ON THRESHOLD

Michael Shur, Charlottesville, Va., and Kwyro Lee, Seoul, Rep. of Korea, assignors to University of Virginia Alumni Patents Foundation, Charlottesville, Va.

Filed Feb. 20, 1990, Ser. No. 483,212

Int. Cl.[5] H01L *29/80*

U.S. Cl. 257—24 11 Claims



1. A field-effect transistor comprising:

a substrate of a semi-insulating material;

a buffer layer disposed on said substrate;

a channel region comprising a semiconductive material disposed on said buffer layer;

a barrier layer of a wide bandgap semiconductive material disposed on said channel region;

a gate layer of a semiconductor material of a first conductivity type disposed on said barrier layer;

a source region of a second conductivity type opposite said first conductivity type contacting said channel region proximate a first end of said channel region;

a drain region of said second conductivity type contacting said channel region proximate a second end of said channel region;

ohmic contact metal regions respectively disposed on said source and drain regions; and

a gate metal contact disposed on said gate layer to form an ohmic contact therewith;

wherein said buffer layer includes

a first layer of doped semiconductive material of said first conductivity type and disposed on said substrate, said first layer having a first dopant concentration,

a second layer of undoped semiconductive material disposed on said first layer, and

a third layer of doped semiconductor material of said first

conductivity type disposed on said second layer, said third layer contacting said channel region, said third layer having a second dopant concentration that is less than said first dopant concentration of said first layer.

5,161,236

VIDEO SIGNAL PROCESSING APPARATUS FOR SYNTHESIZING VIDEO SIGNAL WITH MULTIPLE COLOR PATTERN SIGNAL

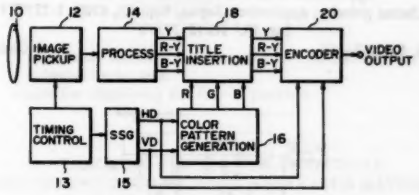
Satoshi Nakayama, Yokohama, and Teruo Hieda, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 14, 1991, Ser. No. 669,495

Claims priority, application Japan, Mar. 22, 1990, 2-72482

Int. Cl.[5] H04N *9/74*

U.S. Cl. 358—22 **11 Claims**



1. A video signal processing apparatus, comprising:

(a) means for inputting a video signal;

(b) binary image generating means for generating a binary image signal;

(c) color pattern generating means for generating color pattern information in synchronism with said video signal; and

(d) synthesizing means for coloring said binary image signal using said color pattern information and synthesizing said colored binary image signal with said video signal.

5,161,237

DISPLAY DEVICE

Robert A. Hartman, and Toru Sakai, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

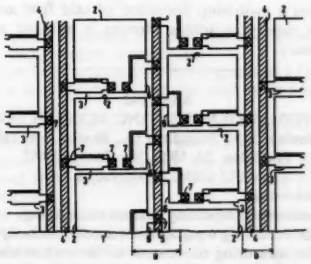
Filed Aug. 17, 1990, Ser. No. 570,241

Claims priority, application Netherlands, Sep. 1, 1989, 8902206

The portion of the term of this patent subsequent to Jul. 16, 2008, has been disclaimed.

Int. Cl.[5] G02F *1/13*

U.S. Cl. 359—54 **21 Claims**



1. A display device comprising: an electro-optical display medium located between two supporting plates, a system of pixels arranged in rows and columns with each pixel comprising picture electrodes arranged on facing surfaces of the supporting plates, a system of row and column electrodes for presenting selection and data signals to the pixels by means of which a range of voltages dependent on the electro-optical display medium can be presented across the pixels to provide a picture display, a plurality of picture electrodes on one of the supporting plates being electrically connected via a first plurality of switching units to a column electrode for data signals and via a plurality of second switching units to an auxiliary voltage electrode for applying an auxiliary voltage across the pixels prior to selection, said auxiliary voltage lying beyond or on the limit of the range to be used for picture display, characterized in that, viewed in a direction perpendicular to the supporting plate, the longitudinal direction of the first switching units are substantially perpendicular to the main direction of the column electrodes and the longitudinal direction of the second switching units are substantially parallel to the main direction of the column electrodes.

5,161,238

APPARATUS FOR CONFINING LASER BEAMS

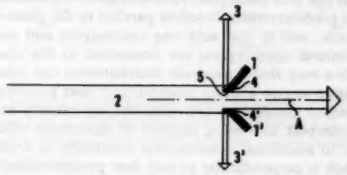
Bernd Mehmke, Bad Sachsa, Fed. Rep. of Germany, assignor to Lambda Physik Forschungs-und Entwicklungs-Gesellschaft GmbH, Fed. Rep. of Germany

Filed Mar. 31, 1989, Ser. No. 331,246

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3818129

Int. Cl.[5] H01S *3/043*

U.S. Cl. 359—738 **5 Claims**



1. A heat-resistant diaphragm for confining a medium/high power laser beam having an optical axis and directed along an optical path, comprising:

wall portions in the optical path and bounding an opening through which a part of the laser beam passes, at least one of the wall portions blocking another part of the laser beam impinging on said at least one blocking wall portion from passing through the opening; and

a light reflector on said at least one blocking wall portion for reflecting the other part of the laser beam impinging directly on said at least one blocking wall portion away from the light reflector and in a direction inclined relative to the optical axis, thereby resisting heat build-up at said at least one blocking wall portion due to direct exposure to the medium/high power laser beam.

5,161,239

RECORDING AND/OR REPRODUCING APPARATUS

Wolfgang Hodulik, Vienna, and Henricus Ruyten, Gumpoldskirchen, both of Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 570,246, Aug. 17, 1990, abandoned. This application Feb. 26, 1992, Ser. No. 842,783

Claims priority, application Austria, Aug. 29, 1988, 2031/89

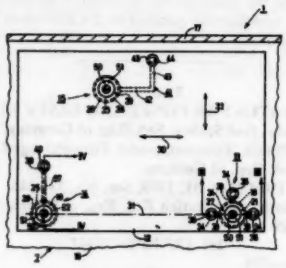
Int. Cl.[5] G11B *33/02, 17/02*

U.S. Cl. 360—137 **12 Claims**

1. A recording and/or reproducing apparatus with a housing and with an essentially plate-shaped chassis which is provided for accommodating components of the apparatus that is connected by three connecting arrangements to a housing part extending a distance from the chassis and essentially parallel to said chassis, said connecting arrangements being arranged

spaced apart in the manner of a three-point bearing, characterized in that:

each of the three connecting arrangements has a supporting part, each said supporting part being firmly connected to the housing part and having a convex spherical supporting surface facing the chassis, and a respective counterpart, one of said counterparts being connected to the chassis and having a rotationally symmetric mating surface which widens continuously toward the housing part, said one counterpart interacting tiltably with one of said convex spherical supporting surfaces; the two additional ones of said counterparts being connected to the chassis in such a



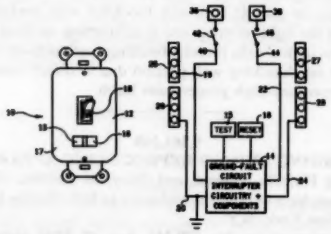
way that movement between said two additional counterparts can take place relative to one another essentially in a first predetermined direction parallel to the plate-shaped chassis, and in that said one counterpart and said two additional counterparts are connected to the chassis in such a way that movement therebetween can take place relative to one another essentially in said predetermined direction parallel to the plate-shaped chassis, said one counterpart also being capable of movement relative to said to additional counterparts essentially in a direction which is perpendicular to said first predetermined direction and parallel to the plate-shaped chassis.

5,161,240

ELECTRIC WALL SWITCH WITH GROUND FAULT PROTECTION

Ken C. Johnson, P.O. Box 781, La Jolla, Calif. 92038

Filed Oct. 26, 1990, Ser. No. 605,106
Int. Cl.[5] H02H *3/28*
U.S. Cl. 361—42 **12 Claims**



7. An electric wall switch assembly, comprising:

an outer casing;

at least one incoming hot line connector and one incoming cold line connector;

a plurality of output connectors on an outer surface of said casing for connection to selected devices to be powered from said switch assembly, said output connectors including at least one outgoing hot load connector and one outgoing cold load connector, and at least one outgoing switch controlled connector;

ground fault circuit interrupter means in said casing connected between said incoming and outgoing connectors for detecting ground faults between said hot and cold load connectors and for opening the circuit between said incoming and outgoing connectors on detection of a ground fault; and

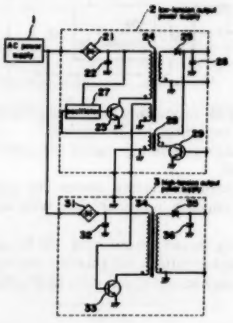
manually operable switch means in said casing connected between said circuit interrupter means and said switch controlled connector for controlling powering of any device connected to said switch controlled connector.

5,161,241

CRT POWER SUPPLY APPARATUS HAVING SYNCHRONIZED HIGH AND LOW VOLTAGE POWER SUPPLY SWITCHING CIRCUITS

Toshio Kanai, Takatsuki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 581,751, Sep. 13, 1990, abandoned. This application Dec. 23, 1991, Ser. No. 813,061
Claims priority, application Japan, Sep. 13, 1989, 1-237777
Int. Cl.[5] H01J *29/70*
U.S. Cl. 363—65 **1 Claim**



1. An apparatus for supplying power to a CRT display device, the CRT display device including a horizontal oscillation circuit and a horizontal output circuit, said apparatus comprising:

a first power supply switching circuit for supplying power to the horizontal oscillation circuit, wherein said first power supply switching circuit is triggered by an output of the horizontal oscillation circuit, and

a second power supply switching circuit for supplying power to the horizontal output circuit, wherein said second power supply switching circuit is triggered by an output of said first power supply switching circuit, wherein a switching operation of said first and second power supply switching circuits is effected at a same frequency.

5,161,242

AUTOMATED REPEATING SEXTANT (ARS)

Peter C. Boulay, 1492 Roundleaf Ct., Reston, Va. 22090

Filed Jan. 24, 1989, Ser. No. 300,842
Int. Cl.[5] G01C *21/02*; G01S *5/08*
U.S. Cl. 364—455 **38 Claims**

1. An automated, repeating sextant comprising:

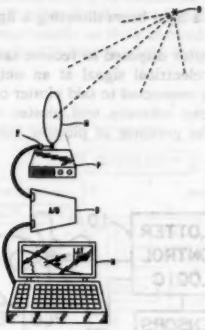
means for receiving a signal from a celestial body;

means for measuring movement of the sextant about a first axis as a first signal which establishes an artificial horizon;

means for detecting a signal received from a celestial body and an angle of incidence of the received signal on the detecting means, said angle of incidence being output by said detecting means;

means responsive to plural values of said first signal and said

angle of incidence for determining a mean altitude of the celestial body, and determining a line of position using



said mean altitude and stored data ephemerides for the celestial body; and,

means for displaying the line of position.

5,161,243

TRACKING SYSTEM FOR AN OPTICAL RECORDING/REPRODUCING APPARATUS HAVING A PLURALITY OF LIGHT SPOTS

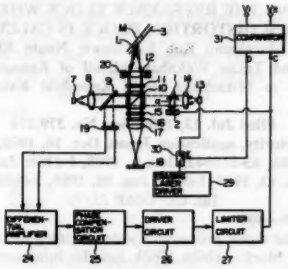
Takashi Ishida, Osaka; Shunji O'Hara, Higashiosaka; Kenzo Ishibashi, Moriguchi, and Toshio Satoh, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 16, 1987, Ser. No. 3,801

Claims priority, application Japan, Jan. 21, 1986, 61-10818; Mar. 4, 1986, 61-46530

Int. Cl.[5] G11B 7/09

U.S. Cl. 369—44.25 **4 Claims**



1. An optical recording and reproducing apparatus having a plurality of light spots, comprising:

light spot forming means for forming at least a first light spot and a second light spot on one track of an optical recording medium,

first deviation detection means for detecting a first deviation of the first light spot from said track,

first drive means for moving the first light spot and the second light spot together in accordance with the first deviation,

second deviation detection means for detecting a second deviation of the second light spot from said track,

second drive means for moving the second light spot relative to the first light spot in accordance with the second deviation, said second drive means including a driver circuit, responsive to said second deviation detection means, for providing a drive signal indicating a magnitude of said second deviation, and

limit means for limiting the value of said drive signal within a predetermined range to limit a movable range of the second light spot to less than one half of a track pitch, normal to said track, from the position of the second light spot when said second drive means is at a neutral position.

5,161,244

CRYPTOGRAPHIC SYSTEM BASED ON INFORMATION DIFFERENCE

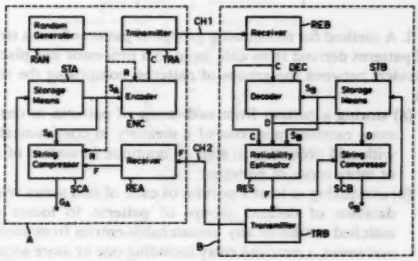
Ueli Maurer, Wil, Switzerland, assignor to Omnisec AG, Regensdorf, Switzerland

Filed Jun. 6, 1991, Ser. No. 711,543

Claims priority, application European Pat. Off., Apr. 29, 1991, 91106949.0

Int. Cl.[5] H04L 9/00

U.S. Cl. 380—43 **24 Claims**



1. A method of generating a cipher key based on information difference in a cryptographic system comprised of at least a first and a second cryptography stations, said method comprising the steps of

storing, in said first and second stations (A,B), a respective string (S_A,S_B) of digits selected from a finite alphabet,

in said first station (A), generating an error-control information string (C) from the respective string (S_A) stored in said first station (A),

transmitting said error-control information string (C) from said first station (A) to said second station (B) over an error-free public channel CH1,

in said second station (B), generating a particular string (D) and a decision bit (F) representative of a reliability estimate, said particular string (D) being that string which maximizes a predetermined reliability function of a string combination (S_B,C,D) consisting of said string (S_B) stored in said second station (B), said error-control information string (C) and said particular string (D), and said decision bit (F) being assigned the value 1 if and only if, when said predetermined reliability function is maximized as said above, a maximum value taken on by said predetermined reliability function is greater than a predetermined threshold, said decision bit (F) else being assigned the value 0,

transmitting said value of said decision bit (F) from said second station (B) to said first station (A) over an error-free public channel CH2,

in said first and second stations (A,B), tagging as accepted said respective strings (S_A,S_B) stored in said first and second stations (A,B) when said decision bit (F) has the value 1,

performing the above sequence of steps a predetermined number of times to result in a corresponding plurality of tagged strings, and

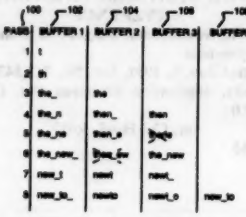
at said first and second stations (A,B), concatenating said tagged strings (S_A,S_B) to result in a random cipher key shared by said first and second stations (A,B).

5,161,245

PATTERN RECOGNITION SYSTEM HAVING INTER-PATTERN SPACING CORRECTION

David Fenwick, Santa Cruz, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.

Filed May 1, 1991, Ser. No. 694,527
Int. Cl.[5] G06K *9/62*
U.S. Cl. 382—40 **17 Claims**



1. A method for recognizing groups of patterns from a string of patterns derived from data input to a processor and placing dividers between the groups of patterns, comprising the steps of:

(a) storing a pattern from said string of patterns in one or more memory positions of a memory in communication with said processor to start or continue formation of one or more series of patterns;

(b) comparing at least a portion of each of said series with a database of defined groups of patterns to locate any matched entries or any unmatchable entries from each of said series, a matched entry including one or more sequential patterns from one of said series which match one of said defined groups of patterns, an unmatchable entry including one or more sequential patterns from one of said series which do not match at least a beginning of one of said defined groups of patterns;

(c) copying each of said series having one of said matched entries from an old memory position to a new memory position in said memory;

(d) placing a divider after said matched entry as stored in said old memory position;

(e) deleting each of said series having one of said unmatchable entries from said memory;

(f) repeating steps (a) through (e) to continue formation of said series until all of said series have been deleted or until an end pattern indicating the end of said string has been stored in one or more of said memory positions;

(g) comparing a last entry from each of said series with said database to locate any final matched series, a final matched series including one or more sequential patterns from one of said series which match one of said defined groups of patterns and which ends with one of said dividers followed by one of said end patterns;

(h) deleting any of said series which is not one of said final matched series; and

(i) saving all of said final matched series in said memory.

5,161,246

SENSOR FOR SENSING MEDIA IN A PLOTTER

Jeff T. Stapleton, Huntington Beach, Calif., assignor to Calcomp Inc., Anaheim, Calif.

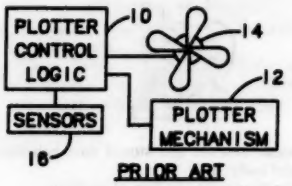
Filed May 2, 1991, Ser. No. 694,562
Int. Cl.[5] G06K *15/00*
U.S. Cl. 395—111 **4 Claims**

1. In a pen plotter wherein plotting media is moved over a platen by a pinch roller and drive drum assembly controlled by plotter control logic in response to commands from a user through a control console and the plotter control logic also turns a motor on when needed for plotting and off when not needed for plotting, a single sensor system for performing two functions comprising:

a) a slot in the platen adjacent the pinch roller and drive drum;

b) a source of a light beam directing a light beam through said slot;

c) a photodetector disposed to receive said light beam and provide an electrical signal at an output thereof, said output being connected to said plotter control logic to be sensed thereby whereby said plotter control logic can determine the presence of plotting media breaking said light beam;



PRIOR ART

d) first supplemental logic means included within the plotter control logic for turning the motor on when the presence of plotting media breaking said light beam is detected and for turning the motor off when the presence of plotting media breaking said light beam is not detected; and,

e) second supplemental logic means included within the plotter control logic for allowing a loading and plotting sequence of the plotter control logic to begin only after a start command is input by a user through the control console and the presence of plotting media breaking said light beam is detected.

5,161,247

DIGITAL SIGNAL PROCESSOR MATCHING DATA BLOCKS AGAINST A REFERENCE BLOCK AND REPLACING THE REFERENCE BLOCK WHEN A NEW MINIMUM DISTORTION BLOCK IS CALCULATED

Tokumichi Murakami; Koh Kamizawa; Naoto Kinjo; Hideo Ohira, and Takao Wakabayashi, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 13, 1989, Ser. No. 379,274
Claims priority, application Japan, Dec. 16, 1988, 63-318941; Dec. 16, 1988, 63-318942; Jan. 9, 1989, 1-1258; Jan. 13, 1989, 1-6805; Jan. 13, 1989, 1-6806; Jan. 18, 1989, 1-9003
Int. Cl.[5] G06F *15/70*
U.S. Cl. 395—800 **4 Claims**

1. A digital signal processor for determining among a plurality of data blocks which block has the minimum distortion compared to a selected reference block comprising:

an instruction memory for storing control means to instruct various internal operations by instruction words;

an internal data memory for storing calculation data;

a calculator for performing iterative minimum distortion calculations in sequential cycles on data read from the internal data memory in accordance with instruction words read from the instruction memory;

an accumulator for accumulating the calculation results of said sequential cycles of minimum distortion calculation output from the calculator;

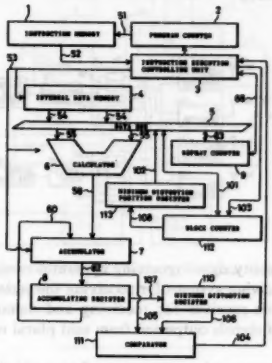
an accumulating register for holding the accumulated minimum distortion calculation output from the accumulator;

a minimum distortion register for holding a minimum distortion reference calculation from said accumulating register for use as a minimum distortion comparison reference;

a block counter for holding the number of a block currently under distortion calculation;

a comparator for comparing the current output value of the

accumulator with the current minimum distortion reference calculation value held in said minimum distortion register during each cycle while, in order to detect the minimum distortion among M blocks (M being a positive integer) of a data series, the iterative distortion calculation is performed sequentially on the k-th block ($1 \leq k \leq M$, "k" being an integer) of M blocks of the data series;



said control means including interrupting means for interrupting said calculations and said accumulation when the current output value from said accumulator exceeds the current value held in said minimum distortion register; and

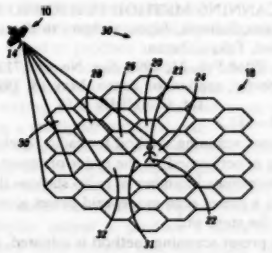
an instruction execution controlling unit for executing the instructions upon decoding the instruction words supplied from the instruction memory.

5,161,248

METHOD OF PREDICTING CELL-TO-CELL HAND-OFFS FOR A SATELLITE CELLULAR COMMUNICATIONS SYSTEM

Bary R. Bertiger, Scottsdale, Ariz.; Raymond J. Leopold, Colorado Springs, Colo., and Kenneth M. Peterson, Phoenix, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 2, 1989, Ser. No. 415,815
Int. Cl.[5] H04B 7/185
U.S. Cl. 455—17 **20 Claims**



1. A method of predicting cell-to-cell hand-offs of a mobile subscriber for a satellite cellular communication system, said satellite projecting a plurality of cells, each cell for facilitating communication with said subscriber, and a processor for executing said method of predicting cell-to-cell hand-offs, said satellite being in orbit about the earth, said method of predicting cell-to-cell hand-offs of a mobile subscriber for a satellite cellular communication system comprising the steps of:

determining the position of said mobile subscriber as being within a first cell of said satellite;

selecting a second cell of said satellite, said second call being in a direction of movement of said satellite as the next cell to be positioned over said mobile subscriber; and

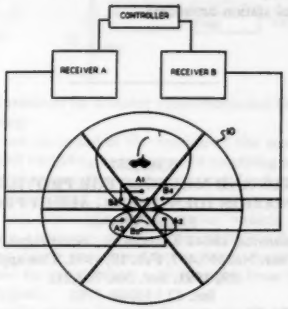
executing said hand-off of said subscriber from said first cell to said second cell when said subscriber is in the proximity of a boundary of said second cell and said first cell.

5,161,249

SECTORED VOICE CHANNELS WITH REAR LOBE PROTECTION

Paul S. Meche, Richardson; Donald V. Hanley, Garland, and Eugenie M. Chaplain, Plano, all of Tex., assignors to Northern Telecom Limited, Montreal, Canada

Continuation of Ser. No. 452,510, Dec. 19, 1989, abandoned. This application Nov. 18, 1991, Ser. No. 794,636
Int. Cl.[5] H04Q 7/00; H04B 15/00
U.S. Cl. 455—33.3 **7 Claims**



2. A system for reducing sectored voice channel interference when a mobile telephone user moves from a serving sector of a cell to a sector adjacent or to the rear thereof, said system comprising:

a) a first set of antennas positioned in a first set of sectors of the cell, each antenna of said first set being connected to a first receiver;

b) a second set of antennas positioned in a second set of sectors comprising sectors adjacent and in between the sectors of said first set, each antenna of said second set being connected to a second receiver;

c) means for continuously scanning at least the sectors adjacent and to the rear of said serving sector as the mobile moves from the serving sector to another sector;

d) means for sending a handoff request message to a cell controller when the signal quality detected from a receiver connected to non-serving sector exceeds the signal quality read by a receiver connected to said serving sector;

e) means for allocating a voice channel on the scanned sector having the better signal quality; and

i) means for initiating a handoff process such that the mobile telephone user can be served by a voice channel on said connected to said non-serving sector.

5,161,250

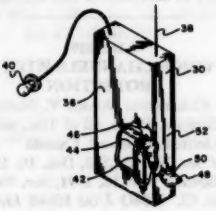
SINGLE USE RADIO DEVICE AND METHOD FOR USING THE SAME

Joseph T. Ianna, Audubon, and John C. Deshong, Manheim, both of Pa., assignors to Play Action Inc., Audubon, Pa.

Filed Apr. 12, 1990, Ser. No. 508,646
Int. Cl.[5] H04B 7/00, 1/16
U.S. Cl. 455—66 **9 Claims**

1. A disposable use apparatus comprising a housing, a battery and a battery-operated device for receiving low power, special frequency radio signals, said apparatus having no means for being turned off and no means for battery replacement or recharging, said battery being permanently sealed within said

housing and having a short useful life of less than one day, wherein said device is a converter which is capable of receiving a special frequency radio signal and converting it to an



unassigned, regular frequency which can be received by a conventional, portable radio receiver without interference by a conventional station broadcast.

5,161,251

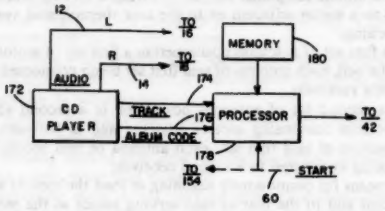
APPARATUS AND METHODS FOR PROVIDING TEXT INFORMATION IDENTIFYING AUDIO PROGRAM SELECTIONS

Roy J. Mankovitz, 18842 Kilfinan St., Northridge, Calif. 91326

Division of Ser. No. 657,477, Feb. 19, 1991. This application Jul. 29, 1991, Ser. No. 737,211

Int. Cl.[5] H04B *1/00*

U.S. Cl. 455—66 **20 Claims**



1. Broadcast apparatus for automatically providing text information identifying a recorded broadcast audio selection, comprising:

compact disk player means for playing a compact disk having multiple tracks each of which contains an audio selection, the disk providing to the player means in addition to the audio selection a digital code which is unique to the audio selection selected for play;

digital processor means coupled to the player means;

test storage means coupled to the digital processor means and having stored therein text information identifying a plurality of audio selections and digital codes, the text information being indexed by the digital codes;

means for automatically providing the digital code from the player means to the processor means, whereby the processor means recalls from the storage means the text information corresponding to the provided digital code;

transmitter means for transmitting the recalled text information at a time substantially concurrent with the transmission of the audio selection corresponding thereto; and

receiver means for receiving the audio selection and the text information, for reproducing the audio selection using audio transducer means, and for displaying the corresponding text information.

5,161,252

DIVERSITY ANTENNA COMMUNICATION SYSTEM

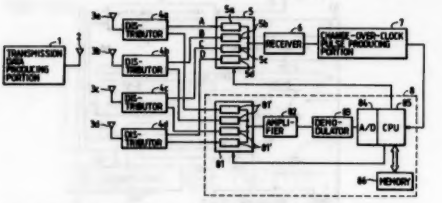
Harukazu Higuchi, and Yoshizo Shibano, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jul. 5, 1989, Ser. No. 375,669

Claims priority, application Japan, Jul. 6, 1988, 63-168573; Aug. 10, 1988, 63-105581[U]; Dec. 23, 1988, 63-327041

Int. Cl.[5] H04B *1/44, 17/02, 1/06*

U.S. Cl. 455—78 **21 Claims**



14. A diversity signal receiving apparatus comprising:

plural receiving systems for receiving the series of signals;

at least one receiver for receiving and demodulating the series of signals outputted from said plural receiving systems;

receiving system detecting means for monitoring and comparing the signal reception levels of said plural receiving systems to detect the alternation time of the maximum reception level in said plural receiving systems;

reception level setting means for setting the upper threshold level and the lower threshold level for a signal reception level at the alternation time and outputting a receiving system change-over signal when the signal reception level of the present receiving system used for actual signal reception is lower than said lower threshold level and when the signal reception level of a signal receiving system providing the maximum reception level exceeds said upper threshold level; and

receiving system change-over means for switching said present receiving system to said receiving system providing the maximum reception level in response to said receiving system change-over signal.

5,161,253

PRESET SCANNING METHOD FOR RADIO RECEIVERS

Sachiyo Hirano, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 21, 1991, Ser. No. 658,713

Claims priority, application Japan, May 18, 1990, 2-126755

Int. Cl.[5] H04B *1/16*

U.S. Cl. 455—161.3 **3 Claims**

1. In a preset scanning method for radio receivers in which the scanning is performed, in the order of preset channels, on all of a predetermined number of radio stations that are preset according to a preset scan mode, said preset scanning method comprising the steps of:

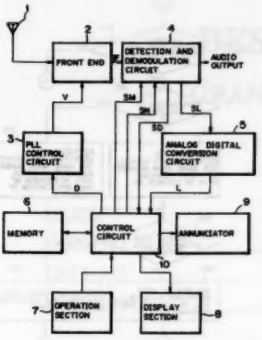
when the preset scanning method is initiated, setting a first reception field strength setting to a predetermined level;

scanning the preset radio stations in the order of the channels to receive radio signals only from those stations each having the reception field strength higher than the predetermined level for a specified period of time;

when not all of the preset stations are found to have the reception field strength higher than the first level of the reception field strength setting, second reception field strength setting at a level lower than the first reception field strength; and

scanning the preset radio stations in the order of the preset

channels to receive radio signals in the order of the channels to receive radio signals only from those stations each



having the reception field strength higher than the second level for a specified period of time.

5,161,254

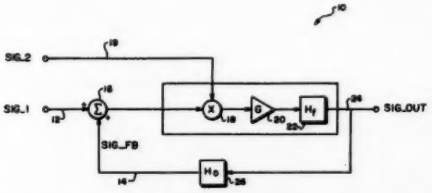
ACTIVE FILTERING MIXER

Russell E. Braathen, Calgary, Canada, assignor to NovAtel Communications, Ltd., Calgary, Canada

Filed Dec. 3, 1990, Ser. No. 621,359

Int. Cl.[5] H04B *1/10*

U.S. Cl. 455—306 **38 Claims**



7. An active filtering mixer comprising:

A) summer means for adding a first input signal and a mixer feedback signal to produce a sum signal;

B) multiplier means coupled with said summer means for multiplying said sum signal by a second input signal, thereby mixing said first and second input signals and producing a multiplier output signal;

C) amplifier means coupled with said multiplier means for amplifying said multiplier output signal with a gain G;

D) first filter means coupled with said amplifier means and having a transfer characteristic H_f for filtering said amplified multiplier output to produce a mixer output signal applied to a mixer output line, said mixer output signal comprising a wanted component and an unwanted component; and

E) second filter means coupled with said first filter means and said summer means, and having a transfer characteristic H_o, for filtering said mixer output signal to produce said mixer feedback signal and applying said mixer feedback signal to said summer means; and

F) wherein said amplifier means and first and second filter means cause said mixer feedback signal to be of an amplitude, frequency and phase that attenuates said unwanted component in said mixer output signal.

5,161,255

MOTOR VEHICLE-MOUNTED RADIO WAVE RECEIVING GPS APPARATUS REQUIRING NO DRILL HOLES FOR MOUNTING

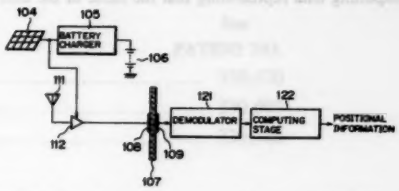
Toshiaki Tsuchiya, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jan. 24, 1991, Ser. No. 645,527

Claims priority, application Japan, Jan. 26, 1990, 2-14971; Jan. 26, 1990, 2-14972

Int. Cl.[5] H04B *1/16*; H05K *11/02*

U.S. Cl. 455—345 **9 Claims**



1. A GPS receiver for a motor vehiclemounted GPS apparatus comprising:

an outer unit mounted at the outside of the motor vehicle body shell including an antenna for receiving radio waves from artificial satellites and a preamplifier for amplifying the received signal;

an inner unit located inside the motor vehicle body shell including a demodulator for demodulating the received signal to derive a required information therefrom and a computer for determining a self-position from the demodulated signal;

signal transfer means for transferring signals between said outer unit and inner unit by utilizing no wire; and

a power source mounted at the outside of the motor vehicle body shell for supplying an electric power to said outer unit, said power source comprising a solar cell and a secondary battery.

5,161,256

METHOD AND SYSTEM FOR ALLOCATING FILE AREA IN MEMORY AREA OF IC CARD

Yasuo Iijima, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 24, 1989, Ser. No. 398,080

Claims priority, application Japan, Aug. 26, 1988, 63-211828; Aug. 31, 1988, 63-216805; Aug. 31, 1988, 63-216806

Int. Cl.[5] G06K *19/06*

U.S. Cl. 902—26 **7 Claims**

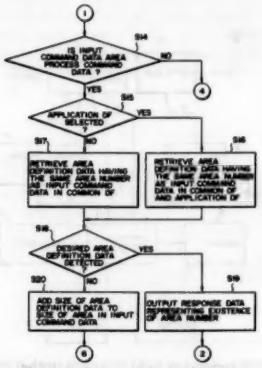
1. A method for allocating new file area in a memory area of a memory of an IC card having an identification area and a plurality of data file areas, the identification area for storing file identification information having a name of a data file and a head address of the data file and used to identify the data file, the memory area being divided by a plurality of data files, each of the data file areas being allocated in the memory area using the file identification information, data being written into the data file areas by using the file identification information, the method performed on said IC card and comprising the steps of:

receiving a file identification command and a name of new data file to be allocated, from an external device;

determining whether the name of the new data file is the same as any name of a data file in the memory area of the memory, in accordance with the file identification information stored in the memory, when the file identification command is received from the external device;

allocating the new data file by writing the received name of the new data file to be allocated and size information into the identification area only when the name of the new data file is determined not to be the same in said determining step; and

outputting data representing that the name of the data file has been written from the IC card to the external device



when the name of the new data file is determined to coincide with a name of the data file allocated in the memory area of the memory.

DESIGN PATENTS

GRANTED November 3, 1992

ERRATA

For CLASS	See PATENT NO.
D009-341	330,670
D013-103	330,693
D023-209	330,746

DESIGN PATENTS

GRANTED November 3, 1992

ERRATA

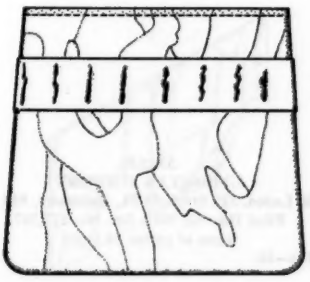
Re	Re
CLEAR	PATENT NO.
D309,041	339,070
D311,103	339,600
D313,329	339,784

DESIGNS

NOVEMBER 3, 1992

330,622
BOOT
Zygmund Piskorowski, 8 S. 10th Ave., Manville, N.J. 08835
Filed Jul. 20, 1990, Ser. No. 554,824
Term of patent 14 years
U.S. Cl. D2—272

330,623
SHOE MOUNTED FOOT WARMER POUCH
Harry Kelley, 3587 Shady Grove Rd., Fultondale, Ala. 35068
Filed Nov. 6, 1990, Ser. No. 610,984
Term of patent 14 years
U.S. Cl. D2—314



330,624
SHOE UPPER
William J. Worthington, Portland, Oreg., assignor to Nike, Inc. and Nike International, Ltd., Beaverton, Oreg.
Filed Oct. 10, 1991, Ser. No. 774,295
Term of patent 14 years
U.S. Cl. D2—314

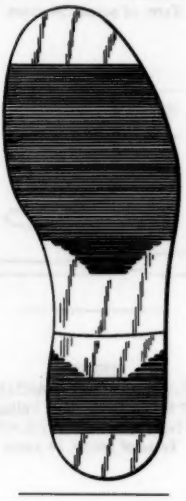
330,625
SHOE UPPER
Robert J. Lucas, Portland, Oreg., assignor to Nike, Inc. and Nike International, Ltd., both of Beaverton, Oreg.
Filed Dec. 13, 1991, Ser. No. 806,427
Term of patent 14 years
U.S. Cl. D2—314

330,626
SHOE UPPER
Steve C. McDonald, Portland, and Allen W. Van Noy, Beaverton, both of Oreg., assignors to Nike, Inc., Beaverton, Oreg.
Filed Dec. 13, 1991, Ser. No. 806,537
Term of patent 14 years
U.S. Cl. D2—314

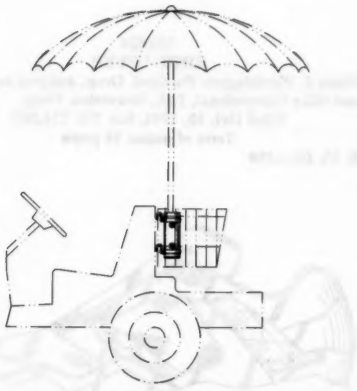
330,627
SHOE INSERT
Enrico Frachey, Ponderano, and Alfredo Crespan, Mignagola di Carbonepa, both of Italy, assignors to Global Sports Technologies, Inc., Tortola, British Virgin Isls.
Continuation-in-part of Ser. No. 527,876, May 24, 1990, Pat. No. 5,092,060. This application Dec. 23, 1991, Ser. No. 812,221
Claims priority, application Italy, May 24, 1989, 20614 A/89
Term of patent 14 years
U.S. Cl. D2—318

330,628
SHOE INSERT
Enrico Frachey, Ponderano, and Alfredo Crespan, Mignagola Di Carbonera, both of Italy, assignors to Global Sports Technologies, Inc., Tortola, British Virgin Isls.
Continuation-in-part of Ser. No. 527,876, May 24, 1990, Pat. No. 5,092,060. This application Dec. 23, 1991, Ser. No. 812,223
Claims priority, application Italy, May 24, 1989, 20614 A/89
Term of patent 14 years
U.S. Cl. D2—318

330,629
TREAD SURFACE AND PERIPHERY OF A FOOTWEAR UNIT SOLE
Marco Bramani, Milan, Italy, assignor to Vibram S.p.A., Italy
Filed Aug. 20, 1991, Ser. No. 748,381
Term of patent 14 years
U.S. Cl. D2—320

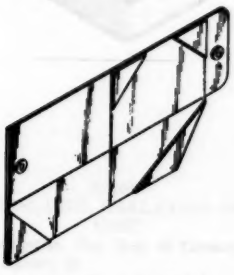


330,630
UMBRELLA SUPPORT
William B. Loden, 322 Starlight Pl., Baltimore, Md. 21093
Filed Dec. 14, 1990, Ser. No. 627,367
Term of patent 14 years
U.S. Cl. D3—10



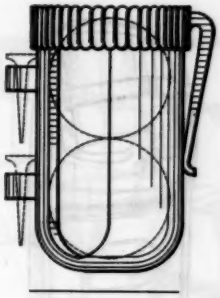
330,631
COMBINED GOLF BAG AND COOLER
Mart O. Ledbetter, 5760 Shady Oak St., Huber Heights, Ohio 45424
Filed Oct. 19, 1990, Ser. No. 600,087
Term of patent 14 years
U.S. Cl. D3—37

330,632
WALLET FOR COIN, CARD, AND CURRENCY
Robert L. Hensley, 1450 N. Kenter Ave., Los Angeles, Calif. 90049
Filed Feb. 26, 1990, Ser. No. 485,075
Term of patent 14 years
U.S. Cl. D3—56



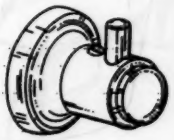
330,633
SUPPORT FOR AN ARCHER'S COMPOUND BOW
Robert Lavin, 1651 Trap Rd., Vienna, Va. 22180
Filed Apr. 24, 1987, Ser. No. 42,007
Term of patent 14 years
U.S. Cl. D3—100

330,634
GOLF TEE AND BALL CARRIER
Chris I. Mandraccia, 1700 Willow Creek Dr., Columbia, S.C. 29212
Filed Jul. 10, 1989, Ser. No. 377,298
Term of patent 14 years
U.S. Cl. D3—104

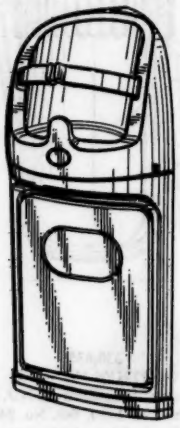


330,635
CLOTHES HANGER
Yaffa Licari, 875 Ocean Ave., Elberon, N.J. 07740
Filed Jun. 28, 1990, Ser. No. 545,963
Term of patent 14 years
U.S. Cl. D6—317

330,636
ROBE HOOK
Norton Sharpe, 10543 Garwood Pl., Los Angeles, Calif. 90024
Filed Mar. 2, 1990, Ser. No. 487,228
Term of patent 14 years
U.S. Cl. D6—323



330,637
CHILD'S CHAIR
Takehiko Takahashi, Tokyo, and Jun Taketani, Aichi, both of Japan, assignors to Combi Corporation, Tokyo, Japan
Filed Mar. 13, 1990, Ser. No. 493,545
Claims priority, application Japan, Dec. 25, 1989, 1-46906
Term of patent 14 years
U.S. Cl. D6—333

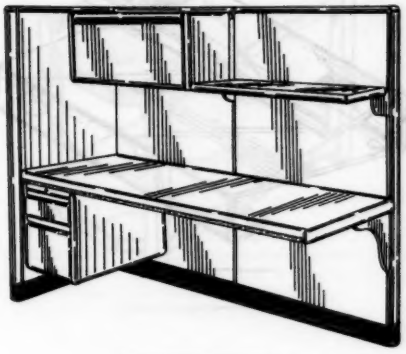


330,638
ARMCHAIR
Franco Moschini, Tolentino, Italy, assignor to Poltrona Frau S.p.A., Tolentino, Italy
Filed Mar. 14, 1989, Ser. No. 323,323
Claims priority, application Italy, Sep. 14, 1988, 21869/88[U]
Term of patent 14 years
U.S. Cl. D6—334

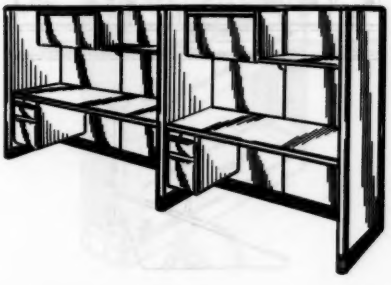
330,639
SEAT WITH COOLER COMPARTMENT
Doug S. Munro, 9942 124th Street, Surrey, British Columbia, Canada V3V 4L4, and Joe Birner, 400 Glenbrook Drive, New Westminster, British Columbia, Canada V3L 5J5
Filed Oct. 27, 1989, Ser. No. 427,361
Term of patent 14 years
U.S. Cl. D6—335

330,640
COLLAPSABLE SEAT
Akira Yoshimura, Los Angeles, Calif., assignor to W.I.G. Inc., Arcadia and Nikko Communications U.S.A., Inc., Los Angeles, both of, Calif.
Filed May 3, 1989, Ser. No. 346,816
Term of patent 14 years
U.S. Cl. D6—368

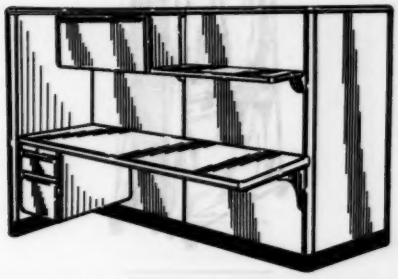
330,641
COMBINED DESK, WALL PANEL AND STORAGE UNIT
Otto Zapf, Koenigstein/Ts, Fed. Rep. of Germany, assignor to Allsteel Inc., Aurora, Ill.
Continuation-in-part of Ser. No. 384,018, Jul. 24, 1989, Pat. No. Des. 323,251. This application May 10, 1990, Ser. No. 521,596
The portion of the term of this patent subsequent to Jan. 21, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—421



330,642
COMBINED DUAL DESK, WALL PANEL AND STORAGE UNIT
Otto Zapf, Koenigstein, Fed. Rep. of Germany, assignor to Allsteel Inc., Aurora, Ill.
Continuation-in-part of Ser. No. 384,018, Jul. 24, 1989, Pat. No. Des. 323,251. This application Jun. 1, 1990, Ser. No. 532,081
The portion of the term of this patent subsequent to Jan. 21, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—421



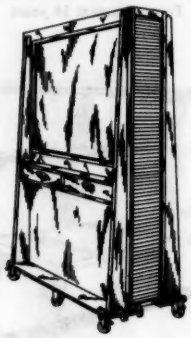
330,643
COMBINED DESK, WALL PANEL AND STORAGE UNIT
Otto Zapf, Koenigstein, Fed. Rep. of Germany, assignor to Allsteel Inc., Aurora, Ill.
Continuation-in-part of Ser. No. 384,018, Jul. 24, 1989, Pat. No. Des. 323,251. This application Jun. 1, 1990, Ser. No. 536,483
The portion of the term of this patent subsequent to Jan. 21, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—421



330,644
TABLE
Mario Bellini, Milan, Italy, and Dieter Thiel, Basel, Switzerland, assignors to Fehlbaum & Co., Switzerland
Filed Apr. 14, 1989, Ser. No. 338,646
Claims priority, application Int'l Pat. Institute, Oct. 19, 1988, DM/011991
Term of patent 14 years
U.S. Cl. D6—422

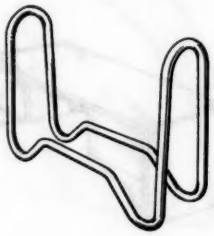
330,645
DESK
Ward Bennett, One W. 72nd St., New York, N.Y. 10023
Filed Nov. 30, 1989, Ser. No. 443,354
Term of patent 14 years
U.S. Cl. D6—422

330,646
FOLDING ROOM DIVIDER
Paul Maas, 1387 Woodland La., Riverwoods, Ill. 60015
Filed Oct. 15, 1990, Ser. No. 598,443
Term of patent 14 years
U.S. Cl. D6—429

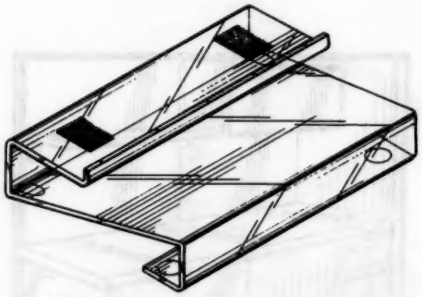


330,647
CABINET
Ward Bennett, One West 72nd St., New York, N.Y. 10023
Filed Nov. 30, 1989, Ser. No. 443,353
Term of patent 14 years
U.S. Cl. D6—432

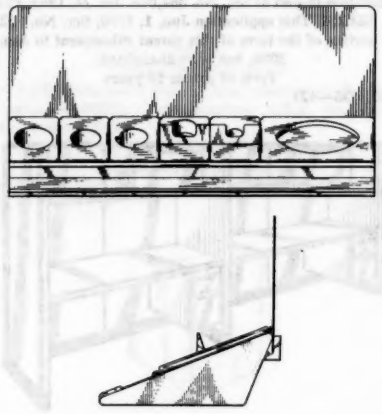
330,648
FIREWOOD STORAGE RACK
Jeffrey B. Lippert, 230 E. Lodi Ave., Lodi, Calif. 95240
Filed Jan. 16, 1990, Ser. No. 464,771
Term of patent 14 years
U.S. Cl. D6—462



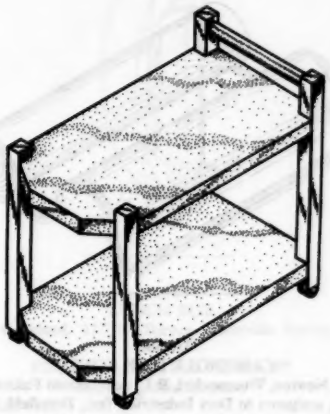
330,649
TELEVISION ACCESSORY CADDY
Richard R. Lemire, 80 Fourth Ave., Lowell, Mass. 01854
Filed Mar. 20, 1991, Ser. No. 672,603
Term of patent 14 years
U.S. Cl. D6—466



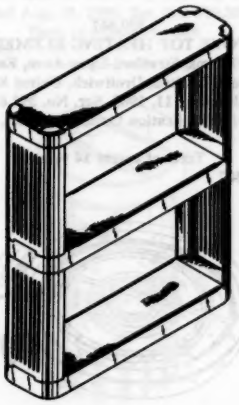
330,650
DISPLAY RACK
Robert B. Staubitz, Collinsville; Kenneth D. Harris, Jr., Winstead, and Timothy C. Repp, Avon, all of Conn., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.
Filed Jan. 28, 1991, Ser. No. 646,327
Term of patent 14 years
U.S. Cl. D6—467



330,651
SERVING CART
Gino Battaglia, 25022 S. Vermont Ave., Harbor City, Calif. 90710-0323
Filed Feb. 13, 1990, Ser. No. 479,581
Term of patent 14 years
U.S. Cl. D6—479



330,652
KNOCK DOWN SHELVING UNIT
Charles R. Goetz, Carnegie, Pa., assignor to Alco Industries Inc., Valley Forge, Pa.
Filed Feb. 14, 1991, Ser. No. 655,098
Term of patent 14 years
U.S. Cl. D6—479



330,653
PORTABLE SUNSHADE
Yu Zheng, 1065 Howard St., Covina, Calif. 91103
Filed Apr. 10, 1990, Ser. No. 506,762
Term of patent 14 years
U.S. Cl. D6—491

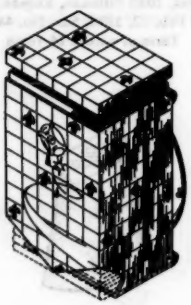
330,654
PEDESTAL OR SIMILAR ARTICLE
Raymond E. Barcias, 1033 Stillman, Eugene, Oreg. 97404
Filed Feb. 22, 1990, Ser. No. 482,991
Term of patent 14 years
U.S. Cl. D6—495

330,655
PEDESTAL OR SIMILAR ARTICLE
Raymond E. Barcias, 1033 Stillman, Eugene, Oreg. 97404
Filed Feb. 22, 1990, Ser. No. 483,000
Term of patent 14 years
U.S. Cl. D6—495

330,656
PEDESTAL OR SIMILAR ARTICLE
Raymond E. Barciss, 1033 Stillman, Eugene, Oreg. 97404
Filed Feb. 22, 1990, Ser. No. 483,001
Term of patent 14 years
U.S. Cl. D6—495

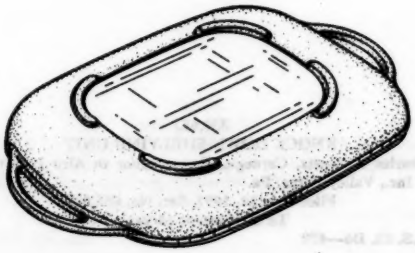
330,657
FURNITURE LEG
Rose Tarlow, 8454 Melrose Pl., Los Angeles, Calif. 90069
Filed Apr. 10, 1990, Ser. No. 506,763
Term of patent 14 years
U.S. Cl. D6—495

330,658
TOWEL-LIKE WIPER DISPENSER
Marquerite Manning, 351 Broad St. #1009, Newark, N.J. 07104
Filed Jan. 5, 1990, Ser. No. 461,445
Term of patent 14 years
U.S. Cl. D6—522

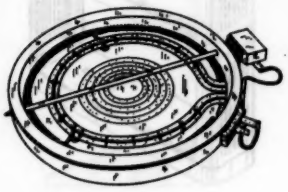


330,659
PROTECTIVE SHADE FOR USE PRIMARILY BY A SUNTANNER
Frank E. Vones, 17 Vones La., Bridgewater, N.J. 08807
Filed Aug. 16, 1989, Ser. No. 394,513
Term of patent 14 years
U.S. Cl. D6—575

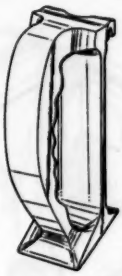
330,660
CASSEROLE DISH COVER
Brian L. Newton, Woonsocket, R.I., and Takeshi Fukuda, Suita, Japan, assignors to Dart Industries, Inc., Deerfield, Ill.
Filed Dec. 6, 1990, Ser. No. 624,916
Term of patent 14 years
U.S. Cl. D7—392.1



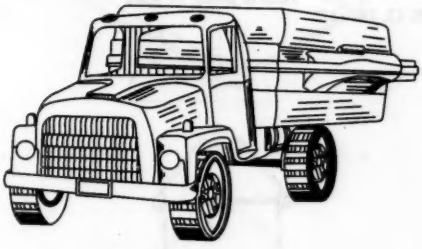
330,661
STOVE TOP HEATING ELEMENT
Kevin R. McWilliams, Stratford-Upon-Avon, England, assignor to Ceramaspeed Limited, Droitwich, United Kingdom
Filed Aug. 11, 1989, Ser. No. 392,614
Claims priority, application United Kingdom, Feb. 14, 1989, 1057119
Term of patent 14 years
U.S. Cl. D7—407



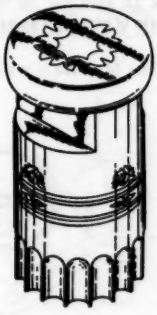
330,662
BEVERAGE DISPENSER GRIP
Pedro R. Nuno, 2404 Borax Dr., Santa Clara, Calif. 95051
Filed Nov. 21, 1990, Ser. No. 616,317
Term of patent 14 years
U.S. Cl. D7—622



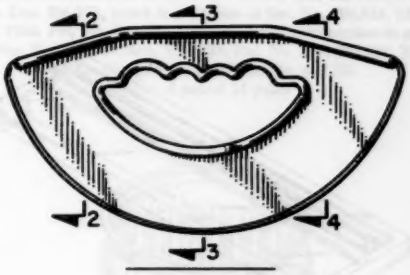
330,663
LUNCH BOX
Tommie Copeland, 517 N. Spruce, Colorado Springs, Colo. 80905
Filed Jan. 5, 1990, Ser. No. 461,455
Term of patent 14 years
U.S. Cl. D7—627



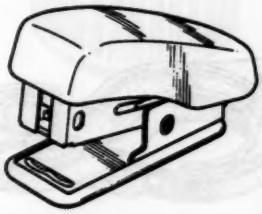
330,664
FOOD CHOPPER
Carl W. Johnson, 4234 N. 15th Ave., Phoenix, Ariz. 85015
Filed Aug. 21, 1990, Ser. No. 570,359
Term of patent 14 years
U.S. Cl. D7—693



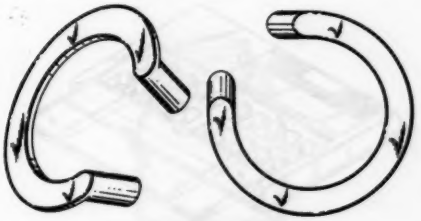
330,665
PIZZA PIE CUTTER
John M. Neuendorf, 2004 Hemlock St., West Bend, Wis. 53095
Filed May 17, 1991, Ser. No. 701,981
Term of patent 14 years
U.S. Cl. D7—693



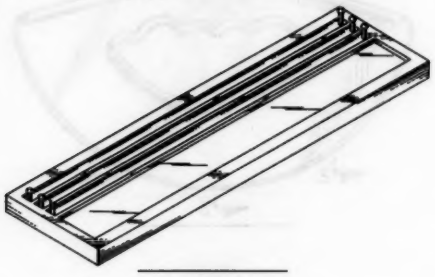
330,666
STAPLER
Siu-Leung Chan, Kowloon, Hong Kong, assignor to Tung Yung Stationery Mfy., Ltd., Hong Kong
Filed Apr. 12, 1991, Ser. No. 684,352
Claims priority, application United Kingdom, Nov. 14, 1990, 2011076
Term of patent 14 years
U.S. Cl. D8—50



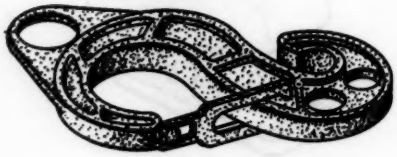
330,667
HANDLE
Winfried Scholl, Düsseldorf, Fed. Rep. of Germany, assignor to Hewi Heinrich Wilke GmbH, Arolsen, Fed. Rep. of Germany
Filed Jun. 26, 1989, Ser. No. 371,404
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, M 88 04 109.3
Term of patent 14 years
U.S. Cl. D8—315



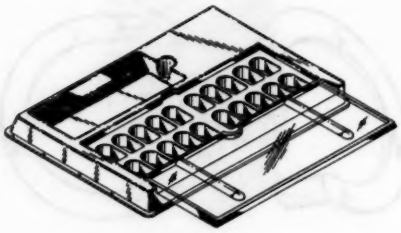
330,668
WORK HOLDER FOR STRINGING BEADS
Brian H. Nagamatsu, Glenville, N.Y., assignor to KUMAco, Glenville, N.Y.
Filed Sep. 5, 1989, Ser. No. 402,439
Term of patent 14 years
U.S. Cl. D8—71



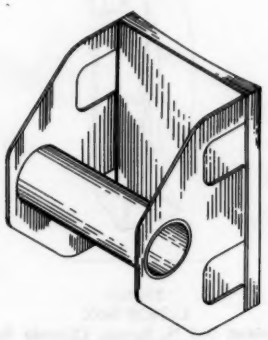
330,669
HOOK
Jou Hui-Chuan, No. 11, Lane 436, Sec. 1, Chung Shan Rd., Changhua, Taiwan
Filed May 19, 1989, Ser. No. 353,919
Term of patent 14 years
U.S. Cl. D8—382



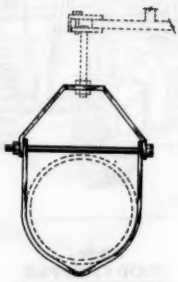
330,670
MULTICOMPARTMENT CONTAINER
Evangelos G. Georgakis, Whittier, and Kenneth E. Hoevel, Monrovia, both of Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Continuation-in-part of Ser. No. 137,812, Dec. 23, 1987, Pat. No. 4,898,276. This application Jan. 29, 1988, Ser. No. 150,534
Term of patent 14 years
U.S. Cl. D9—341



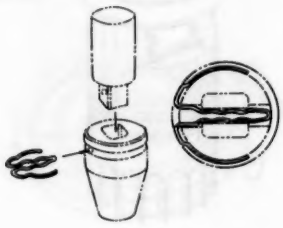
330,671
PULLEY FOR LOWERING TREE BRANCHES
Thomas F. Greene, 2 Harrison Eaton Ln., Amesbury, Mass. 01913, and Arthur B. Davidson, 56 Ingleside Ave., Cranston, R.I. 02910
Filed Oct. 29, 1990, Ser. No. 604,599
Term of patent 14 years
U.S. Cl. D8—360



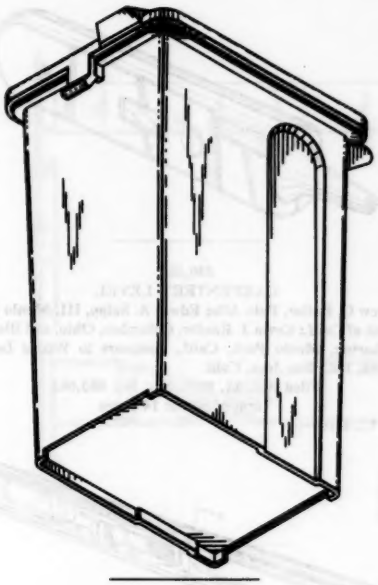
330,672
PIPE HANGER
Joseph Wilkinson, III, Rte. 6, Box 6142, Brazoria, Tex. 77422
Filed May 16, 1990, Ser. No. 524,176
Term of patent 14 years
U.S. Cl. D8—373



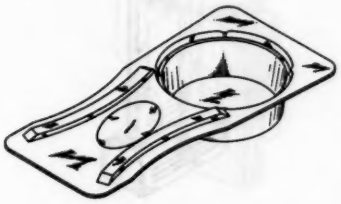
330,673
HOLDING PIN
Shoichiro Yamashita, Ogasa, Japan, assignor to Ko-Ken Tool Co., Ltd., Ogasa, Japan
Filed Oct. 23, 1990, Ser. No. 601,587
Term of patent 14 years
U.S. Cl. D8—382



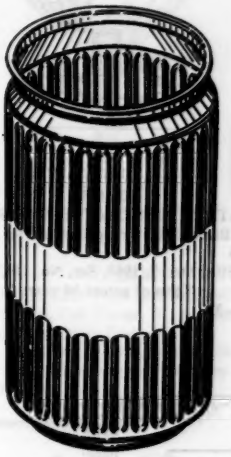
330,674
CONTAINER FOR PACKAGED PRODUCTS
Chris J. Lyon, P.O. Box 429, Estill, S.C. 29918
Filed Aug. 8, 1990, Ser. No. 550,351
Term of patent 14 years
U.S. Cl. D9—420



330,675
CONDIMENT CONTAINER
Juerg Braendli, Umikon, Switzerland, assignor to Zweifel Pomy-Chips Ltd., Spreitenbach, Switzerland
Filed Nov. 15, 1990, Ser. No. 615,003
Claims priority, application Int'l Pat. Institute, May 15, 1990, DM/016671
Term of patent 14 years
U.S. Cl. D9—425



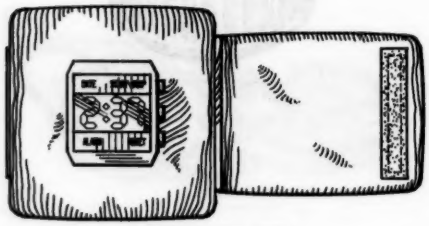
330,676
CAN
Andrew Halasz, Crystal Lake; Thomas E. Moloney, Wheaton; Nelson N. Chernikoff, Richton Park, and Richard D. Zenger, Downers Grove, all of Ill., assignors to American National Can Company, Chicago, Ill.
Continuation-in-part of Ser. No. 351,769, May 12, 1989, which is a continuation-in-part of Ser. No. 945,314, Dec. 22, 1986, Pat. No. Des. 306,972, which is a division of Ser. No. 594,610, Mar. 24, 1984, Pat. No. Des. 290,688, which is a continuation-in-part of Ser. No. 523,514, Aug. 15, 1983, Pat. No. Des. 283,011. This application Nov. 9, 1989, Ser. No. 432,396
Term of patent 14 years
U.S. Cl. D9—556



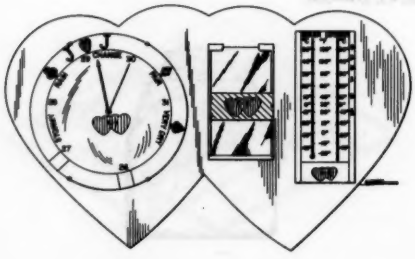
330,677
BOTTLE
Del M. Thornock, Concord, and James R. Goldberg, Novato, both of Calif., assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Dec. 27, 1989, Ser. No. 457,418
Term of patent 14 years
U.S. Cl. D9—558

330,678
CLOCK
Dennis C. Prudhomme, Bloomingdale, Ill., assignor to Elden, Inc., Franklin Park, Ill.
Filed Jun. 7, 1990, Ser. No. 534,422
Term of patent 14 years
U.S. Cl. D10—23

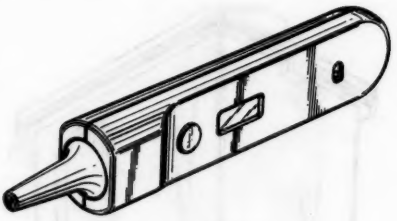
330,679
COMBINATION WRISTWATCH AND SWEATBAND
Antoinette D. Bland, 5600 Orangethorpe Ave. #914, La Palma, Calif. 90623
Filed Oct. 7, 1988, Ser. No. 254,795
Term of patent 14 years
U.S. Cl. D10—32



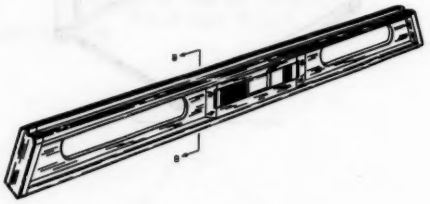
330,680
COMBINED BAROMETER AND THERMOMETER OR SIMILAR ARTICLE
Julius C. Lienhard, 9317 Lakeland Ct., Richmond, Va. 23229
Filed Jan. 30, 1987, Ser. No. 9,131
Term of patent 14 years
U.S. Cl. D10—53



330,681
RADIATION CLINICAL THERMOMETER
Masato Yamada, Tokyo, and Shunji Egawa, Tokorozawa, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan
Filed Oct. 26, 1990, Ser. No. 604,432
Term of patent 14 years
U.S. Cl. D10—57

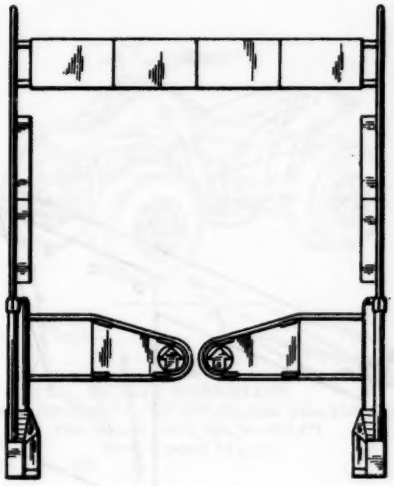


330,682
CARPENTER'S LEVEL
Andrew C. Butler, Palo Alto; Edwin A. Seipp, III, Menlo Park, both of Calif.; Kevin J. Reeder, Columbus, Ohio, and Blake R. Wharton, Menlo Park, Calif., assignors to Wedge Innovations, Inc., San Jose, Calif.
Filed Apr. 11, 1991, Ser. No. 683,662
Term of patent 14 years
U.S. Cl. D10—69

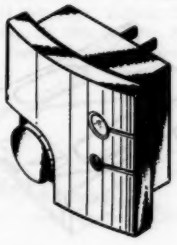


330,683
HOUSING FOR ANTI-THEFT DETECTOR
Richard T. Green, P.O. Box 321, Eustace, Tex. 75124
Filed Dec. 10, 1990, Ser. No. 624,679
Term of patent 14 years
U.S. Cl. D10—104

330,684
ELECTRONIC GATE
Alice Joseph, Schiltigheim, France, assignor to Ateliers Reunic Caddie, Schiltigheim, France
Filed Aug. 7, 1990, Ser. No. 563,963
Claims priority, application France, Feb. 14, 1990, 90 0995
Term of patent 14 years
U.S. Cl. D10—106

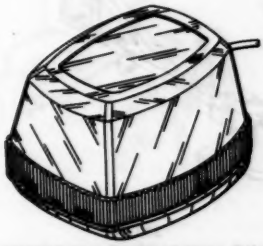


330,685
SIGNAL TRANSMITTER
Vincent A. Juliana, Chester Springs, and Steven Pancheri, Downingtown, both of Pa., assignors to Invisible Fence Company, Inc., Berwyn, Pa.
Filed Feb. 1, 1991, Ser. No. 648,626
Term of patent 14 years
U.S. Cl. D10—106



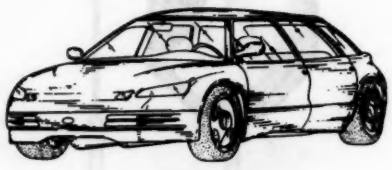
330,686
TRAFFIC CONTROL STOP SIGN
Joseph M. Campagna, 361 N. Bromley Ave., Scranton, Pa. 18504
Filed Feb. 7, 1991, Ser. No. 651,921
Term of patent 14 years
U.S. Cl. D10—109

330,687
WARNING LIGHT FOR EMERGENCY VEHICLES
Edward J. Stanuch, Oak Forest, Ill., assignor to Federal Signal Corporation, University Park, Ill.
Filed Oct. 5, 1990, Ser. No. 593,625
Term of patent 14 years
U.S. Cl. D10—114

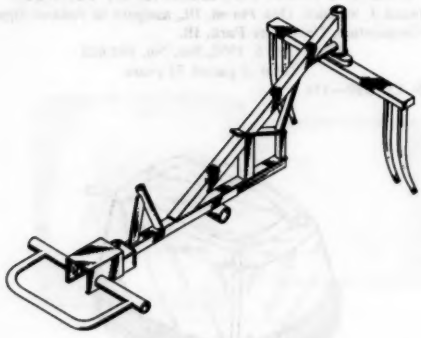


330,688
TIE CLIP
Patrick R. Haines, 19915 SE. 296th, Kent, Wash. 98042
Filed Dec. 3, 1990, Ser. No. 620,933
Term of patent 14 years
U.S. Cl. D11—202

330,689
PASSENGER CAR
Tetsuya Hayashi, Ohmiya; Hiroshi Yako, Ohta, both of Japan; Hiroshi Ono, Huntington Beach, Calif.; Yuji Uemura, Irvine, Calif., and Danny E. Ellis, Mission Viejo, Calif., assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 3, 1990, Ser. No. 547,445
Term of patent 14 years
U.S. Cl. D12—91

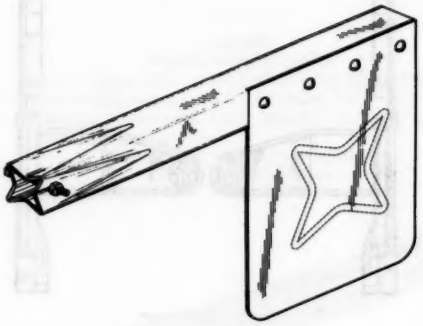


330,690
FRAME FOR MULTI-WHEELED VEHICLE
Ciro J. R. Miceli, 15 Windridge St., Aliso Viejo, Calif. 92656
Filed Mar. 4, 1991, Ser. No. 663,706
Term of patent 14 years
U.S. Cl. D12—107

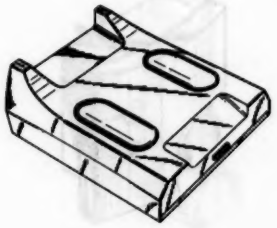


330,691
DUAL BLADE AUTOMOTIVE WINDSHIELD WIPER
Carl W. Leu, Miami, Fla., assignor to Poli-Auto, Inc., Miami, Fla.
Filed Jan. 11, 1991, Ser. No. 640,009
Term of patent 14 years
U.S. Cl. D12—155

330,692
REMOVABLE MUD FLAP FOR VEHICLES
Arden D. Hammond, Jr., 721 Prescotts Heights Dr., Prescott, Ariz. 86301
Filed May 17, 1991, Ser. No. 700,907
Term of patent 14 years
U.S. Cl. D12—185



330,693
BATTERY UNIT FOR A PORTABLE RADIO TELEPHONE
Katsuhito Watanabe; Naoko Seki, and Eriko Ino, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Apr. 2, 1991, Ser. No. 678,149
Term of patent 14 years
U.S. Cl. D13—103

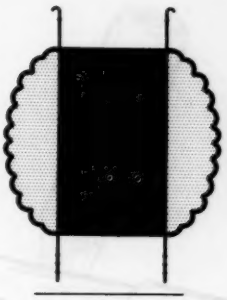


330,694
OFF ROAD VEHICLE
Kazutaka Kimura, Oomiya, and Kazuhiko Yokoyama, Kawagoe, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 20, 1991, Ser. No. 672,725
Claims priority, application Japan, Sep. 21, 1990, HEI-2-31818
Term of patent 14 years
U.S. Cl. D12—107

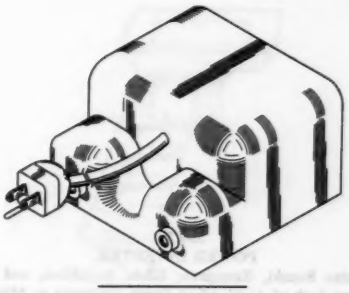
330,695
BICYCLE WORK STAND
Robert D. Simmons, P.O. Box 3577, Big Bear Lake, Calif. 92315
Filed Apr. 18, 1991, Ser. No. 692,471
Term of patent 14 years
U.S. Cl. D12—115

330,696
WIPER WASHER UNIT FOR THE REAR WINDOW OF A CAP FOR THE BED OF A PICKUP TRUCK
Jacques R. Alain, 21 Roland St., Enfield, Conn. 06082
Filed Sep. 19, 1990, Ser. No. 584,841
Term of patent 14 years
U.S. Cl. D12—155

330,697
AUTOMOBILE SUNSHADE COVER
Xiaoning Zhou, 3338 Sawtelle Blvd. #2, Los Angeles, Calif. 90066
Filed Feb. 22, 1991, Ser. No. 659,060
Term of patent 14 years
U.S. Cl. D12—156

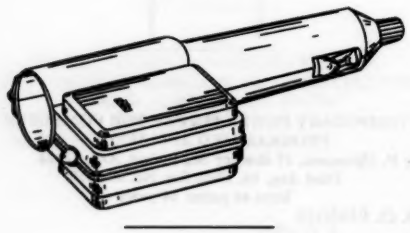


330,698
TEMPORARY POWER SUPPLY FOR COMPUTER PROGRAMMED APPLIANCES
Guy P. Thompson, 37 Bradley St., Bryant, Ark. 72022
Filed Aug. 16, 1989, Ser. No. 394,510
Term of patent 14 years
U.S. Cl. D13—123



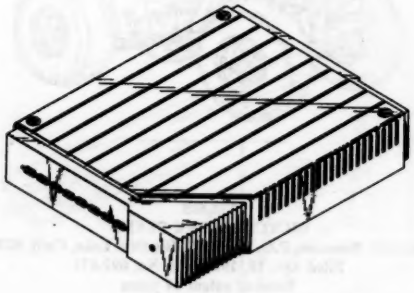
330,699
INSULATED STAPLE
Brian C. Gill, Fitzwilliam, N.H., assignor to W. W. Cross, Inc., Jaffrey, N.H.
Filed Oct. 19, 1990, Ser. No. 600,393
Term of patent 14 years
U.S. Cl. D13—154

330,700
AUTOMATICALLY ACTUATED ELECTRICAL SWITCH FOR USE WITH AN AUTOMOBILE POWER SYSTEM
Richard F. Wharton, Glenview, Ill., assignor to Safco Corporation, Chicago, Ill.
Filed Feb. 20, 1990, Ser. No. 482,682
Term of patent 14 years
U.S. Cl. D13—158



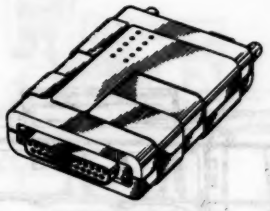
330,701
POWER INVERTER
Masakatsu Suzuki, Kanagawa; Eiichi Sugishima, and Hideo Iinuma, both of Aichi, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 9, 1990, Ser. No. 492,174
Claims priority, application Japan, Sep. 14, 1989, 1-33754
The portion of the term of this patent subsequent to Jul. 21, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D13—162

330,702
MULTIPLEXER
Adrian P. Hutton, Ipswich, England, assignor to British Telecommunications public limited company, London, England
Filed Oct. 6, 1989, Ser. No. 417,776
Claims priority, application United Kingdom, Apr. 6, 1989, 1058433
The portion of the term of this patent subsequent to Aug. 11, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D13—184

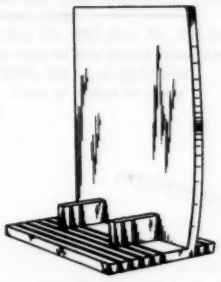


330,703
ELECTRONIC COMPUTER HOUSING
David Cheung, New Territories, and Ho L. Tse, Kowloon, both of Hong Kong, assignors to Video Technology Industries, Inc., Wheeling, Ill.
Filed May 17, 1990, Ser. No. 525,185
Claims priority, application United Kingdom, Jan. 23, 1990, 2004201
Term of patent 14 years
U.S. Cl. D14—100

330,704
COMPUTER MODERN HOUSING
Eric Wagner, Brunbjörnsvägen 47, S-722 42 VästerÅs, Sweden
Filed Feb. 28, 1990, Ser. No. 486,182
Claims priority, application Sweden, Sep. 1, 1989, 89-1973
The portion of the term of this patent subsequent to Oct. 30, 2007, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—107

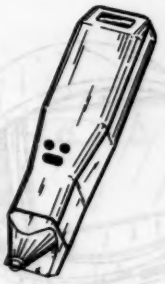


330,705
COMPUTER STAND
Hanumaiah L. Gowda, Lakewood; John Kowalik, Jr., Freehold, both of N.J.; Henry J. Mack, Jr., Levittown, Pa.; David J. Mayer, New York, N.Y., and Stephen G. Miggels, Wyckoff, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.
Filed Apr. 12, 1990, Ser. No. 508,022
Term of patent 14 years
U.S. Cl. D14—114



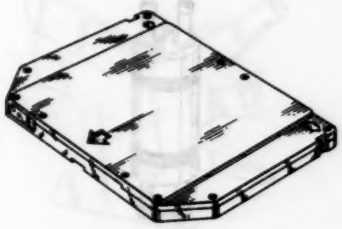
330,706
COMPUTER MOUSE
Cheng San-Yih, 4 Lane 83 Guei-Suei Street, Taipei, Taiwan
Filed Apr. 20, 1990, Ser. No. 511,543
Term of patent 14 years
U.S. Cl. D14—114

330,707
BAR CODE SCANNER
Craig S. Whitaker, Auburn, N.Y., assignor to PSC Corp., Webster, N.Y.
Filed May 23, 1991, Ser. No. 706,520
Term of patent 14 years
U.S. Cl. D14—116

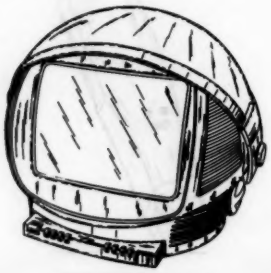


330,708
BAR CODE SCANNER
Vincent T. LaManna, Webster; Dean S. White, Holcomb, and L. Michael Hone, Webster, all of N.Y., assignors to PSC Corp., Webster, N.Y.
Filed Jun. 24, 1991, Ser. No. 721,371
Term of patent 14 years
U.S. Cl. D14—116

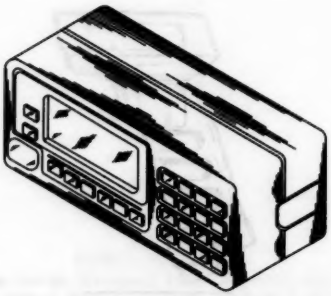
330,709
MAGNETIC TAPE CARTRIDGE
John M. Favrou, Del Mar, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Oct. 22, 1990, Ser. No. 601,083
Term of patent 14 years
U.S. Cl. D14—121



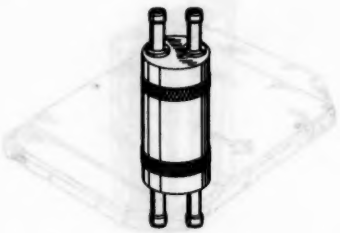
330,710
TELEVISION RECEIVER
Honson Lee, Valkenswaard, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Feb. 2, 1990, Ser. No. 477,096
Claims priority, application World Int. Prop. O., Aug. 29, 1989, DM/014435
Term of patent 14 years
U.S. Cl. D14—126



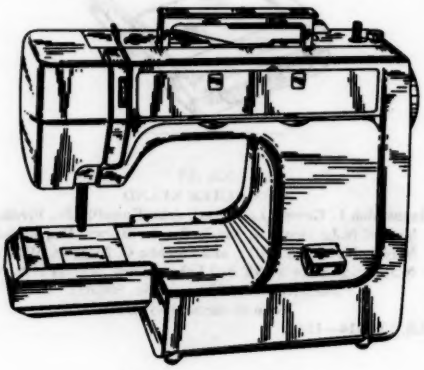
330,711
CONTROL HEAD FOR A TWO-WAY RADIO
Mas Tokiyama, Arlington, Tex., assignor to Motorla, Inc., Schaumburg, Ill.
Filed Mar. 22, 1990, Ser. No. 498,141
Term of patent 14 years
U.S. Cl. D14—257



330,712
FUEL FILTER
Wayne H. Pingel, and Donna M. Pingel, both of 2076 C 11th Ave., Adams, Wis. 53910
Filed Mar. 7, 1990, Ser. No. 489,602
Term of patent 14 years
U.S. Cl. D15—5

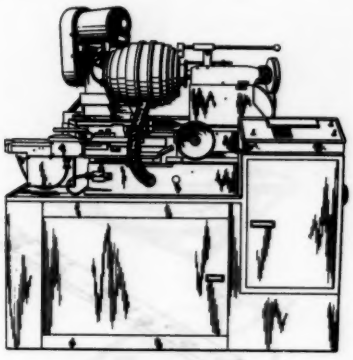


330,713
SEWING MACHINE
Nobufusa Kuroki, Tokyo, Japan, assignor to Janome Sewing Machine Co., Ltd., Tokyo, Japan
Filed Aug. 28, 1990, Ser. No. 574,241
Claims priority, application Japan, Aug. 21, 1990, 2-27823
Term of patent 14 years
U.S. Cl. D15—70

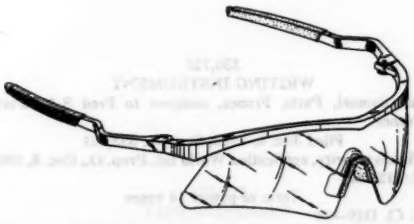


330,714
PORTABLE HYDRAULIC PUNCHING INSTRUMENT
Kiyoshi Kimura, Fujisawa, Japan, assignor to Kabushiki Kaisha Ogura, Japan
Filed Nov. 21, 1989, Ser. No. 440,013
Claims priority, application Japan, May 22, 1989, 1-18559
Term of patent 14 years
U.S. Cl. D15—128

330,715
LENS PROFILER
Joe L. Welch, Jenks; John Compelube, Warner, and Robin D. Friedhoff, Bixby, all of Okla., assignors to Coburn Optical Industries, Inc., Tulsa, Okla.
Filed Feb. 27, 1990, Ser. No. 496,770
Term of patent 14 years
U.S. Cl. D15—124



330,716
EYEGLASSES
James H. Jannard, San Juan Capistrano, Calif., assignor to Oakley, Inc., Irvine, Calif.
Filed Sep. 11, 1990, Ser. No. 580,508
The portion of the term of this patent subsequent to Sep. 15, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D16—116



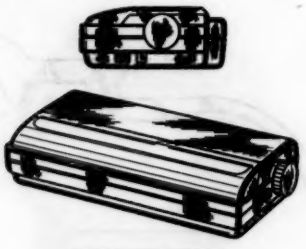
330,717
COMBINED GOGGLE STRAP AND EAR COVERS
Douglas S. Rupert, 69 Cresta Verde Dr., Rolling Hills Estates, Calif. 90274, and Todd A. Lavell, 308 Streamwood, Irvine, Calif. 92720
Filed Oct. 10, 1989, Ser. No. 419,617
Term of patent 14 years
U.S. Cl. D16—123

330,718
TEMPLE FOR EYEGLASS FRAME
Joseph Hatchiguian, Saint Germain en Laye, France, assignor to Sporoptic Pouilloux S.A., Paris, France
Filed Jul. 3, 1991, Ser. No. 725,258
Claims priority, application France, Jan. 11, 1991, 91 0140
Term of patent 14 years
U.S. Cl. D16—127

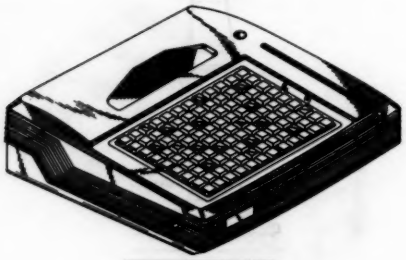
330,719
MICROSCOPE
Masaaki Ishibashi, Tokyo, Japan, assignor to Olympus Optical Company, Limited
Filed Aug. 29, 1990, Ser. No. 574,252
Claims priority, application Japan, May 18, 1990, 2-16731
Term of patent 14 years
U.S. Cl. D16—131

330,720
GUITAR BODY
Joel M. Harriott, P.O. Box 542, Minneapolis, Minn. 55458
Filed Nov. 27, 1989, Ser. No. 441,432
The portion of the term of this patent subsequent to Aug. 25, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D17—20

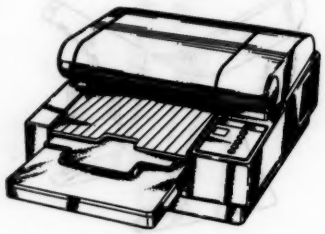
330,721
PRINTER FOR ELECTRONIC COMPUTER
Tsutomu Yoshihara, Ayase, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed May 23, 1990, Ser. No. 527,253
Claims priority, application Japan, Nov. 24, 1989, 1-42666
Term of patent 14 years
U.S. Cl. D18—50



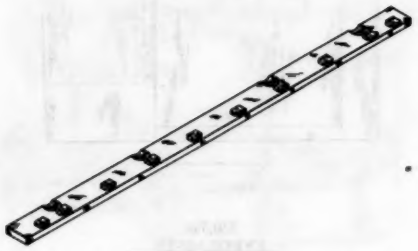
330,722
MODULAR POINT OF SALE TERMINAL
Patrick N. M. Je, Singapore, Singapore, assignor to Essex Electric Pte Ltd., Singapore
Filed Jul. 6, 1990, Ser. No. 548,778
Claims priority, application United Kingdom, Feb. 21, 1990, 2004845
Term of patent 14 years
U.S. Cl. D18—4



330,723
COLOR PRINTER FOR COMPUTER
Susumu Mitsushima; Kiyoshige Ishiyama; Takeshi Okuno; Hiromitsu Ogita, and Junichi Kurokawa, all of Ise, Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan
Filed Oct. 10, 1989, Ser. No. 420,253
Claims priority, application Japan, Apr. 14, 1989, 1-13834
Term of patent 14 years
U.S. Cl. D18—55



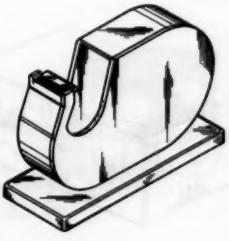
330,724
PRINTING BLANKET MOUNTING BAR
Alton E. Gansky, 4623 Bella Dr., and William A. Harris, 4490 Emerald Dr., both of Colorado Springs, Colo. 80918
Filed Sep. 20, 1990, Ser. No. 586,014
Term of patent 14 years
U.S. Cl. D18—56



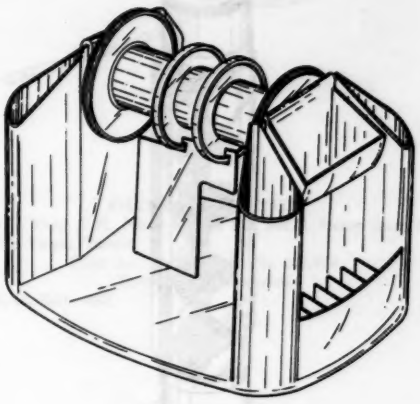
330,725
WRITING INSTRUMENT
Henri Samuel, Paris, France, assignor to Fred S.A., Paris, France
Filed Jun. 6, 1990, Ser. No. 533,901
Claims priority, application World Int. Prop. O., Dec. 8, 1989, DM/015 288
Term of patent 14 years
U.S. Cl. D19—50

330,726
COMBINED CASE AND SEXUAL EDUCATION KIT
Allen W. Craven, Hamilton, Canada, assignor to Janal Creations Inc., Hamilton, Canada
Filed Sep. 18, 1989, Ser. No. 408,312
Claims priority, application Canada, Mar. 16, 1989, 16-03-89-1
Term of patent 14 years
U.S. Cl. D19—62

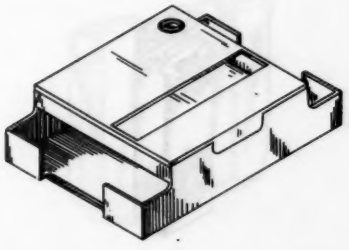
330,727
TAPE DISPENSER
Alexander R. Wehrle, P.O. Box B, Brooklyn, Iowa 52211
Filed Apr. 22, 1991, Ser. No. 688,886
Term of patent 14 years
U.S. Cl. D19—69



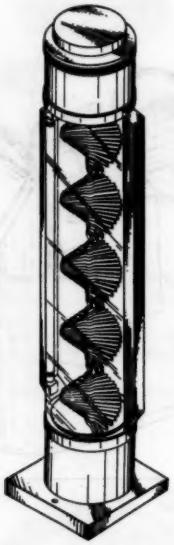
330,728
COMBINED ORGANIZER FOR DESK ACCESSORIES AND ROTARY FILE
Peter Liaw, 25, Lane 60, Alley 164, Fu Lin Street, Taipei, Taiwan
Filed Nov. 8, 1990, Ser. No. 612,273
Term of patent 14 years
U.S. Cl. D19—76



330,729
COMBINED TWO-LEVEL PAPER TRAY AND ADHESIVE NOTE DISPENSER
Robert Cornell, Two Hundred Crescent St., Duxbury, Mass. 02332
Continuation-in-part of Ser. No. 350,025, May 10, 1989, Pat. No. D. 320,412. This application Mar. 29, 1991, Ser. No. 677,826
Term of patent 14 years
U.S. Cl. D19—78



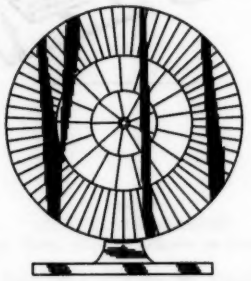
330,730
SIGN POLE
Yoshitsugu Watanabe, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Mar. 8, 1991, Ser. No. 667,053
Claims priority, application Japan, Sep. 10, 1990, 2-D30094
Term of patent 14 years
U.S. Cl. D20—10



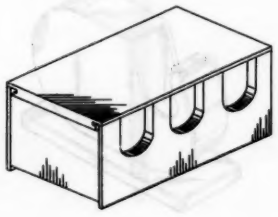
330,731
PARKING LOT SIGN
Hal Sandy, 3927 Glendale Rd., Shawnee Mission, Kans. 66205
Filed Mar. 9, 1990, Ser. No. 491,662
Term of patent 14 years
U.S. Cl. D20—10

330,732
DECAL
Scott C. Cravins, #8 Palm Ct., Santa Paula, Calif. 93060
Filed Oct. 19, 1990, Ser. No. 600,067
Term of patent 14 years
U.S. Cl. D20—11

330,733
GAME
Eralen C. Strey, and Rosie I. Strey, both of R.R. I Box 45, Osseo, Wis. 54758
Filed Jun. 27, 1990, Ser. No. 544,467
Term of patent 14 years
U.S. Cl. D21—22

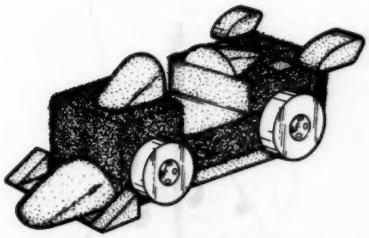


330,734
STORAGE CONTAINER FOR CHIPS
Everett E. Luten, 3310 Highland Laurels, Kingwood, Tex. 77345
Filed Aug. 24, 1990, Ser. No. 572,785
Term of patent 14 years
U.S. Cl. D21—56

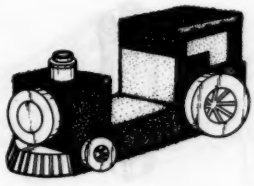


330,735
ROCKING HORSE
Rexford L. Newman, Jr., 3428 Via La Selva, Palos Verdes Estates, Calif. 90274
Filed Jul. 15, 1991, Ser. No. 729,809
Term of patent 14 years
U.S. Cl. D21—75

330,736
RACE CAR CHILD SEAT
Dennis Silber, West Bloomfield, Mich., assignor to The Fred Silber Company, Ferndale, Mich.
Filed Oct. 9, 1991, Ser. No. 773,307
Term of patent 14 years
U.S. Cl. D21—78

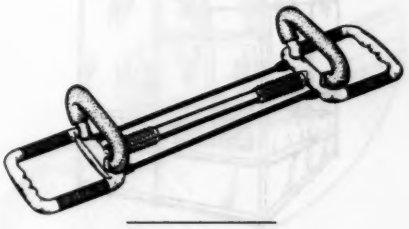


330,737
TRAIN CHILD SEAT
Dennis Silber, W. Bloomfield, Mich., assignor to The Fred Silber Company, Ferndale, Mich.
Filed Oct. 9, 1991, Ser. No. 773,308
Term of patent 14 years
U.S. Cl. D21—76

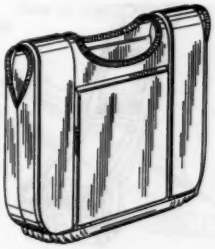


330,738
EXERCISE BAR
David A. Lenhardt, Scottsdale, Ariz., assignor to Omni Merchandising, Inc., Los Angeles, Calif.
Filed Jun. 25, 1990, Ser. No. 543,052
Term of patent 14 years
U.S. Cl. D21—191

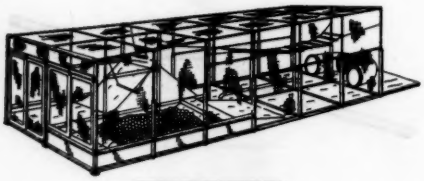
330,739
PHYSICAL EXERCISER
Hsi C. Yang, 3 Fl., No. 9-4, Lane 143, Sec. 1, Hsing Sheng S. Rd., Taipei, Taiwan
Filed Oct. 30, 1990, Ser. No. 605,469
Term of patent 14 years
U.S. Cl. D21—198



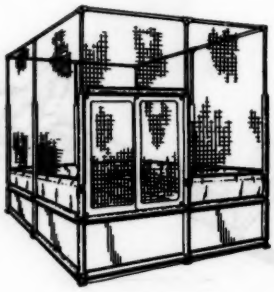
330,740
BOUYANT VEST
Bruce Layton, P.O. Box 3038, Blue Jay, Calif. 92317
Filed Apr. 15, 1991, Ser. No. 685,025
Term of patent 14 years
U.S. Cl. D21—238



330,741
COMBINED AMUSEMENT PLAY AREA AND AN ENCLOSING STRUCTURE
Ronald G. Matsch, Overland Park, Kans., assignor to Discovery Zone, Inc., Kansas City, Mo.
Filed Jun. 4, 1990, Ser. No. 532,978
Term of patent 14 years
U.S. Cl. D21—242

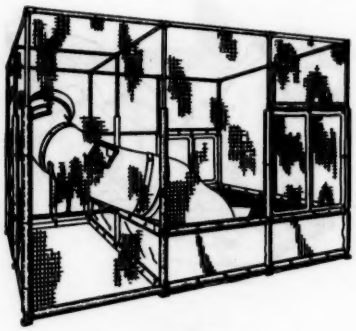


330,742
COMBINED AMUSEMENT JUMPING MATTRESS AND AN ENCLOSING STRUCTURE
Ronald G. Matsch, Overland Park, Kans., assignor to Discovery Zone, Inc., Kansas City, Mo.
Filed Jun. 4, 1990, Ser. No. 533,063
Term of patent 14 years
U.S. Cl. D21—242

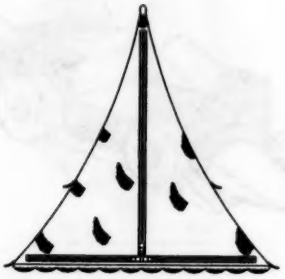


330,743
PLAYGROUND SLIDE
Loron W. Mercer, 12722 Overbrook Rd., Leawood, Kans. 66209
Filed Jan. 23, 1990, Ser. No. 468,990
Term of patent 14 years
U.S. Cl. D21—244

330,744
COMBINED AMUSEMENT TUBE SLIDE AND AN ENCLOSING STRUCTURE
Ronald G. Matsch, Overland Park, Kans., assignor to Discovery Zone, Inc., Kansas City, Mo.
Filed Jun. 4, 1990, Ser. No. 532,977
Term of patent 14 years
U.S. Cl. D21—244



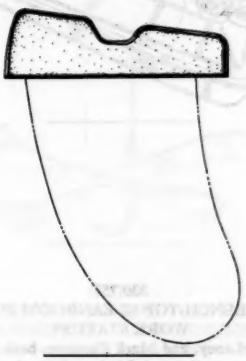
330,745
INFLATABLE FLOOR TENT
Nolan B. Fogle, P.O. Box 146, Powersite, Mo. 65731
Filed Aug. 22, 1990, Ser. No. 570,696
Term of patent 14 years
U.S. Cl. D21—253



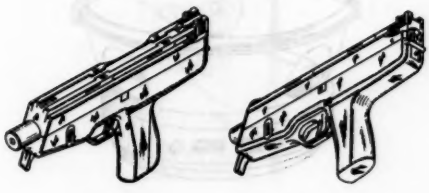
330,746
FILTER HOUSING
Arnold Zazulia, 2008 National Guard Dr., Plant City, Fla. 33507
Filed Nov. 6, 1990, Ser. No. 610,998
Term of patent 14 years
U.S. Cl. D23—209

330,747
WATER CRAFT
Francesco A. Pia, 3 Boulder Brae La., Larchmont, N.Y. 10538
Filed Jan. 15, 1991, Ser. No. 641,673
Term of patent 14 years
U.S. Cl. D21—228

330,748
SHAFT PORTION OF A SKEG FOR A SURF SAILING BOARD
Ferenc Molnar, Micheldorf, Austria, and Helmut Kirner, Wesling, Fed. Rep. of Germany, assignors to F2 International GES.m.b.H., Kirchdorf/Krems, Fed. Rep. of Germany
Filed Nov. 19, 1990, Ser. No. 615,627
Claims priority, application Fed. Rep. of Germany, May 18, 1990, 9003598
Term of patent 14 years
U.S. Cl. D21—231

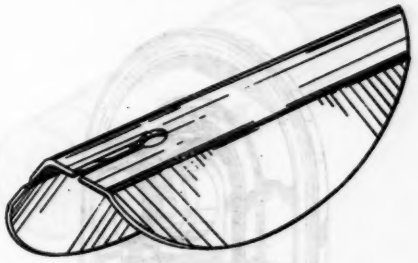


330,749
PISTOL
Friedrich Aigner, St. Valentin, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria
Filed Jun. 20, 1989, Ser. No. 368,525
Claims priority, application Austria, Dec. 23, 1988, 547.877
The portion of the term of this patent subsequent to Jul. 21, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D22—104

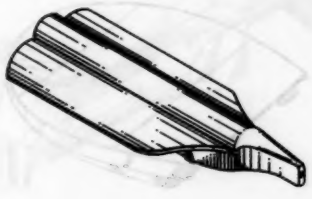


330,750
FISHING LURE
Fred H. Coggins, Brookland, Ark., assignor to Southern Pro Lures, Inc., Brookland, Ark.
Filed Jun. 8, 1990, Ser. No. 534,851
Term of patent 14 years
U.S. Cl. D22—128

330,751
FISHING LURE ATTTACHMENT
Darren L. Drew, 1800 O'Connell, St. Louis, Mo. 63114
Filed Oct. 22, 1990, Ser. No. 604,436
Term of patent 14 years
U.S. Cl. D22—129

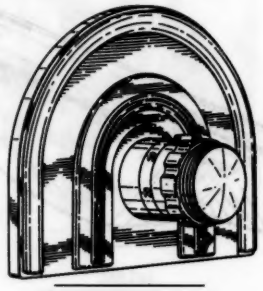


330,752
FISH LINE RUDDER
W. James Spickelmire, Grangeville, Id., assignor to Gem Tackle Company, Grangeville, Id.
Filed May 29, 1990, Ser. No. 530,067
Term of patent 14 years
U.S. Cl. D22—134

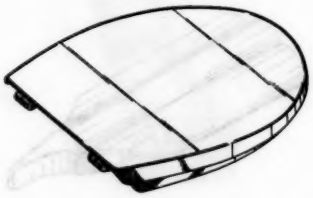


330,753
COMBINED FISHING ROD HOLDER AND STAND
Manuel Gutierrez, 1273 Meadow Sweet Rd., Golden, Colo. 80401
Filed Feb. 21, 1990, Ser. No. 482,685
Term of patent 14 years
U.S. Cl. D22—147

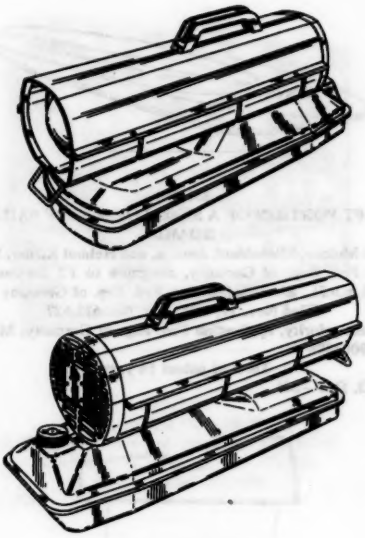
330,754
COMBINED CONTROL HANDLE AND ESCUTCHEON FOR SHOWERS OR THE LIKE
Adolf Gottwald, Iserlohn, Fed. Rep. of Germany, assignor to Friedrich Grohe Armaturenfabrik GmbH & Co., Hemer, Fed. Rep. of Germany
Filed Oct. 11, 1990, Ser. No. 595,928
Claims priority, application Fed. Rep. of Germany, Apr. 19, 1990, 9002736[U]
Term of patent 14 years
U.S. Cl. D23—254



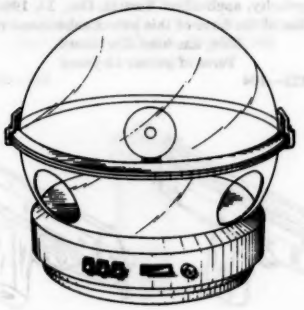
330,755
COMBINED TOILET SEAT AND COVER
Thomas Gerlach, Altensteig, Fed. Rep. of Germany, assignor to Pressalit A/S, Arhus, Denmark
Filed Aug. 15, 1990, Ser. No. 567,672
Claims priority, application Denmark, Feb. 15, 1990, 0185/90
Term of patent 14 years
U.S. Cl. D23—311



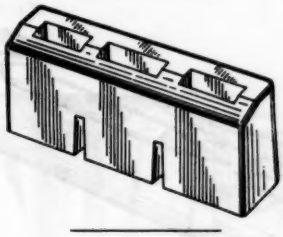
330,756
PORTABLE HEATER
John W. Davies, III, and Clay W. Chalupsky, both of Plymouth, Wis., assignors to The Toro Company, Minneapolis, Minn.
Filed Jul. 15, 1991, Ser. No. 729,671
Term of patent 14 years
U.S. Cl. D23—338



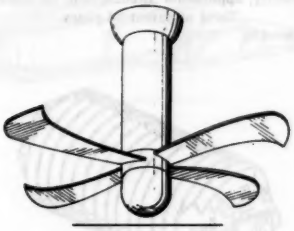
330,757
PORTABLE BENCH-TOP CLEANROOM FOR USE AS A WORK STATION
Richard P. DeLaney, and Mark Cunnane, both of Dublin, Ireland, assignors to Safetech Limited, Ireland
Filed Aug. 2, 1989, Ser. No. 388,553
Claims priority, application Ireland, Feb. 3, 1989, 33/89
Term of patent 14 years
U.S. Cl. D23—364



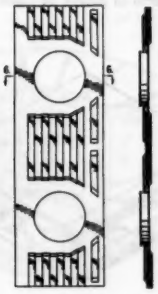
330,758
FRAGRANCE DIFFUSER CARTRIDGE
Kenneth J. Muderlak, Shorewood, Wis., assignor to Technical Concepts, L.P., Chicago, Ill.
Continuation of Ser. No. 521,981, May 7, 1990, Pat. No. 5,111,477. This application Jul. 26, 1990, Ser. No. 558,194
Term of patent 14 years
U.S. Cl. D23—366



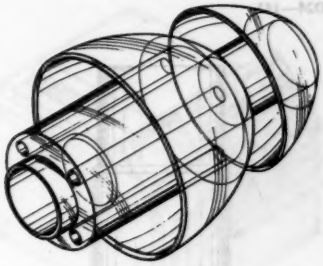
330,759
COMBINED CEILING FAN AND LIGHT
Ron Rezek, Los Angeles, Calif., assignor to Beverly Hills Fan Company, North Hollywood, Calif.
Filed Jul. 12, 1991, Ser. No. 728,996
Term of patent 14 years
U.S. Cl. D23—377



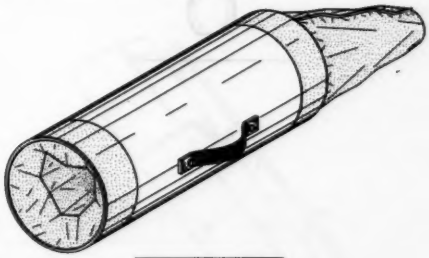
330,760
FIN FOR USE IN A FIN AND TUBE HEATING EXCHANGER IN AN AIR CONDITIONER
Takayuki Yoshida; Tomohumi Tezuka, both of Shizuoka, and Masao Huzii, Amagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 24, 1989, Ser. No. 314,840
Claims priority, application Japan, Oct. 24, 1988, 63-41700
Term of patent 14 years
U.S. Cl. D23—386



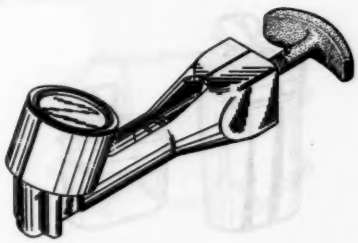
330,761
EARPLUG
Robert N. Falco, Indianapolis, Ind., assignor to Cabot Safety Corporation, Southbridge, Mass.
Filed Sep. 21, 1990, Ser. No. 587,364
Term of patent 14 years
U.S. Cl. D24—106



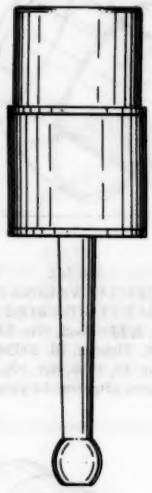
330,762
DISPOSABLE ARTIFICIAL VAGINA FOR COLLECTING OF SEMINAL FLUID FROM ANIMALS
Mark Anderson, R.R. 2, Elmwood, Wis. 54740, and James Griffin, 10015 Green St., Hebron, Ill. 60034
Filed Nov. 16, 1990, Ser. No. 614,757
Term of patent 14 years
U.S. Cl. D24—108



330,763
ANGIOPLASTY INFLATOR
William H. Penny, St. Anthony, and David B. Robinson, Chanhassen, both of Minn., assignors to SciMed Life Systems, Inc., Maple Grove, Minn.
Filed Oct. 22, 1990, Ser. No. 602,073
Term of patent 14 years
U.S. Cl. D24—113

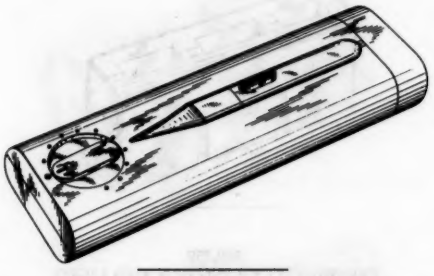


330,764
RECTAL APPLICATOR FOR PHARMACEUTICAL PRODUCTS
Lena Lorentzon, 7, Fredmansgatan, S-116 26 Stockholm, Sweden
Filed Mar. 29, 1990, Ser. No. 501,178
Claims priority, application Sweden, Sep. 29, 1989, 892210; Sep. 29, 1989, 892211
Term of patent 14 years
U.S. Cl. D24—141

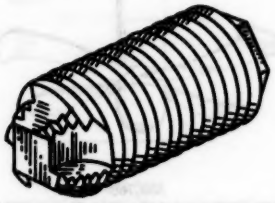


330,765
SHARPS CONTAINER
Adam T. Laws, Balmain East, Australia, assignor to Elowtown Pty. Ltd., Australia
Filed Apr. 10, 1990, Ser. No. 507,296
Claims priority, application Australia, Oct. 13, 1989, 3351/89
Term of patent 14 years
U.S. Cl. D24—131

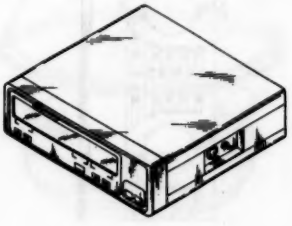
330,766
ELECTROLYSIS APPARATUS
Samuel J. Mann, Fair Lawn, N.J., assignor to Inverness Corporation, Fair Lawn, N.J.
Filed Jun. 1, 1990, Ser. No. 531,810
Term of patent 14 years
U.S. Cl. D24—144



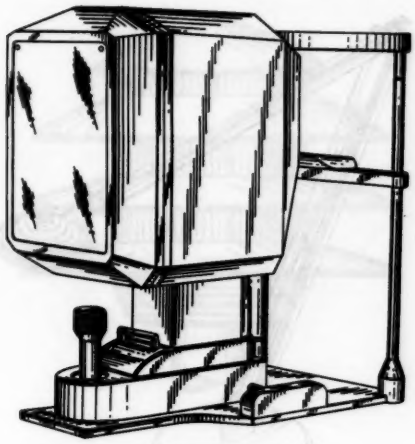
330,767
DENTAL IMPLANT SCREW
Lars Jörnéus, Stjärnbildsgatan 128, S-41518 Göteborg, Sweden
Filed Mar. 14, 1990, Ser. No. 493,383
Claims priority, application Sweden, Sep. 14, 1989, 892065
Term of patent 14 years
U.S. Cl. D24—156



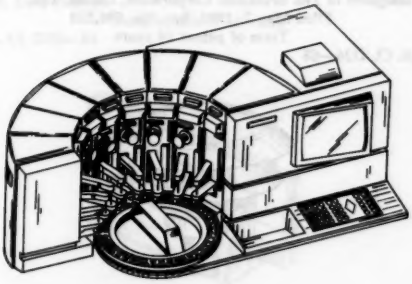
330,768
ELECTRIC CLINICAL SPHYGMOMANOMETER
Masashi Yoshikawa, Tokyo, and Hideo Hata, Fuji, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 15, 1989, Ser. No. 436,919
Claims priority, application Japan, May 16, 1989, 1-17533
Term of patent 14 years
U.S. Cl. D24—165



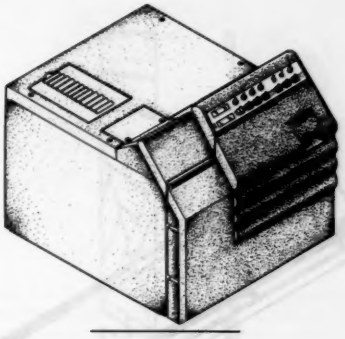
330,769
CONFOCAL LASER-SCANNING OPHTHALMOSCOPE
Erich Blaha, Essingen, and Gerhard Gaida, Aalen, both of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Oberkochen, Fed. Rep. of Germany
Continuation-in-part of Ser. No. 508,403, Apr. 12, 1990. This application Nov. 21, 1990, Ser. No. 617,069
Claims priority, application Fed. Rep. of Germany, Oct. 25, 1989, 8907441
Term of patent 14 years
U.S. Cl. D24—172



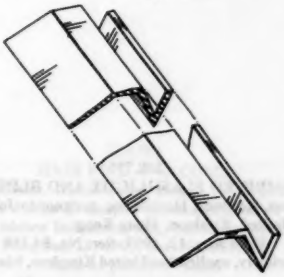
330,770
MODULAR BIOLOGICAL FLUID ANALYZER
Guy F. Rodomista, Natick; Robert L. Coleman, Framingham, and Frederick F. Spaziani, Lexington, all of Mass., assignors to Nova Biomedical Corporation, Waltham, Mass.
Filed Sep. 18, 1989, Ser. No. 408,786
Term of patent 14 years
U.S. Cl. D24—216



330,771
STERILIZER
David B. Chaney, Powell; Sam Fung, Columbus, and Jeffrey P. Brucker, Troy, all of Ohio, assignors to Midmark Corporation, Versailles, Ohio
Filed Jul. 19, 1990, Ser. No. 554,638
Term of patent 14 years
U.S. Cl. D24—217

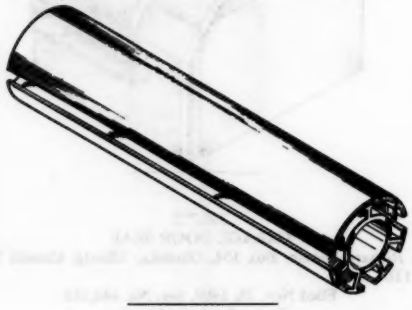


330,772
GARAGE DOOR SEAL
D. Richard Nelson, Box 104, Okotoks, Alberta, Canada T0L 1T0
Filed Nov. 28, 1989, Ser. No. 442,162
Term of patent 14 years
U.S. Cl. D25—119

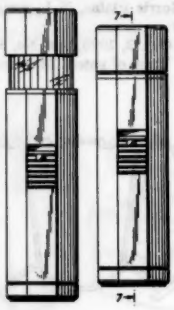


330,773
DECORATIVE EXTRUSION
Peter M. Stagl, Morris Plains, N.J., assignor to Avnet, Inc., Great Neck, N.Y.
Filed Oct. 3, 1990, Ser. No. 592,119
Term of patent 14 years
U.S. Cl. D25—122

330,774
EXTRUDED BAR
Valda Klaric, 157-165 City Road, South Melbourne, Victoria 3205, Australia
Filed Sep. 25, 1990, Ser. No. 588,308
Claims priority, application Australia, Apr. 9, 1990, 1055/90
Term of patent 14 years
U.S. Cl. D25—125



330,775
COMBINED FLASHLIGHT AND BLINKER
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Aug. 12, 1987, Ser. No. 84,118
Claims priority, application United Kingdom, Mar. 18, 1987, 1 040 821
Term of patent 14 years
U.S. Cl. D26—46

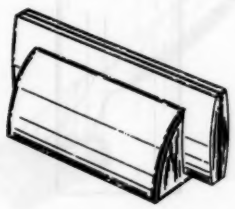


330,776
ADJUSTABLE LAMP
Sava Cvek, Boston, Mass., assignor to Luxo Lamp Corporation, Port Chester, N.Y.
Filed Dec. 21, 1990, Ser. No. 633,424
Term of patent 14 years
U.S. Cl. D26—65

330,777
OUTDOOR LIGHT FIXTURE
Milly S. Hall, Dallas, Tex.; Donald L. Rohrs, Overland Park, Kans., and Kung C. Hung, New Territories, Hong Kong, assignors to The Brinkman Corporation, Dallas, Tex.
Filed May 7, 1991, Ser. No. 696,521
Term of patent 14 years
U.S. Cl. D26—68

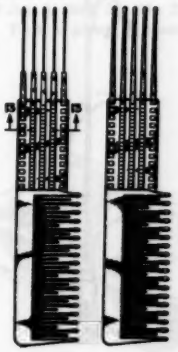
330,778
OUTDOOR LIGHT FIXTURE
Milly S. Hall, Dallas, Tex.; Donald L. Rohrs, Overland Park, Kans., and Kung C. Hung, New Territories, Hong Kong, assignors to The Brinkmann Corporation, Dallas, Tex.
Filed May 7, 1991, Ser. No. 696,531
Term of patent 14 years
U.S. Cl. D26—68

330,779
LUMINAIRE
Menno Dieperink, Amsterdam, and Stefanus F. W. Joosten, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Apr. 13, 1990, Ser. No. 509,542
Claims priority, application World Int. Prop. O., Oct. 30, 1989, DM/014.914
Term of patent 14 years
U.S. Cl. D26—84

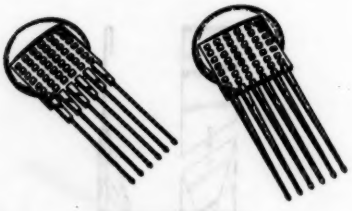


330,780
PENDANT FOR CHANDELIER OR THE LIKE
William Segill, Newton; Mark E. Segill, Framingham, and Michael Dangelo, Seekonk, all of Mass., assignors to American Lighting Fixture Corp., Taunton, Mass.
Filed Apr. 25, 1990, Ser. No. 514,098
Term of patent 14 years
U.S. Cl. D26—154

330,781
HAIR PICK AND COMB
Melvin E. Balster, Minnetonka; Delton A. Kruschke, Apple Valley, and James B. Easely, Minneapolis, all of Minn., assignors to Mebco Industries, Inc., Shakopee, Minn.
Filed Jul. 25, 1990, Ser. No. 558,201
Term of patent 14 years
U.S. Cl. D28—25



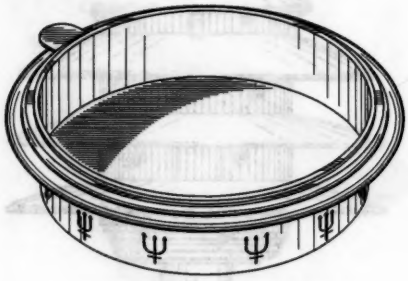
330,782
HAIR PICK
Melvin E. Balster, Minnetonka; Delton A. Kruschke, Apple Valley, and James B. Easely, Minneapolis, all of Minn., assignors to Mebco Industries, Inc., Shakopee, Minn.
Filed Jul. 25, 1990, Ser. No. 558,205
Term of patent 14 years
U.S. Cl. D28—31



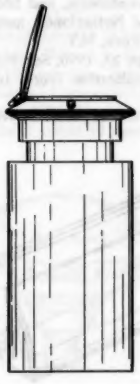
330,783
SPRAY BOTTLE
Pierre Dinand, Paris, France; Robert Luzzi, and Dena Seigel, both of New York, N.Y., assignors to Estee Lauder, Inc., New York, N.Y.
Filed Apr. 19, 1991, Ser. No. 687,669
Term of patent 14 years
U.S. Cl. D28—91.1

330,784
COMBINED CANDLE LIGHTER AND SNUFFER
John R. Zaffoletti, 21 Pilgrim Dr., Warwick, R.I. 02888
Filed Jun. 15, 1990, Ser. No. 538,479
Term of patent 14 years
U.S. Cl. D29—2

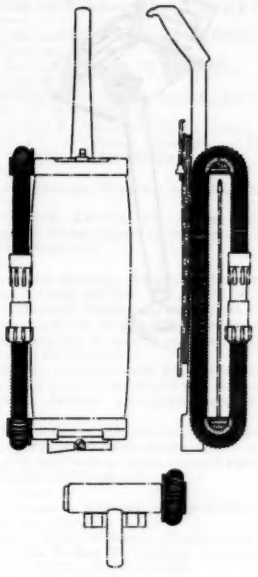
330,785
COMBINED PET FOOD BOWL AND DISPOSABLE LINER
Dianne P. Jordan, 10 S. Wilderness Trail, Ponte Vedra Beach, Fla. 32082
Filed Jul. 13, 1990, Ser. No. 552,414
Term of patent 14 years
U.S. Cl. D30—129



330,786
REFUSE CONTAINER FOR ANIMAL WASTE
Gerald T. Edgar, 8 Beaconsfield Road, Briar Hill, 3088 Victoria, Australia
Filed Jul. 26, 1989, Ser. No. 385,781
Term of patent 14 years
U.S. Cl. D30—161

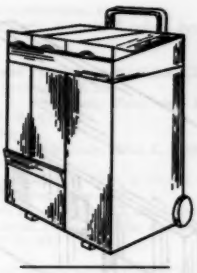


330,787
COMBINED VACUUM CLEANER HOSE AND RACK
Kevin S. Waltz, Massillon, and Sidney H. Bradd, Solon, both of Ohio, assignors to The Hoover Company, North Canton, Ohio
Filed May 6, 1991, Ser. No. 695,773
Term of patent 14 years
U.S. Cl. D32—31



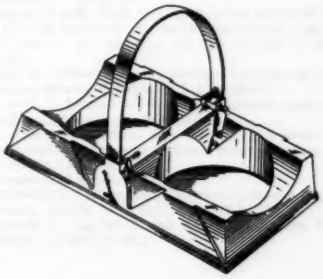
330,788
COMBINED SPONGE AND LIQUID SOAP DISPENSER FOR WASHING DISHES
Enzo Berti, Dolo/Ve, Italy, assignor to The Libman Company, Arcola, Ill.
Filed Jul. 8, 1991, Ser. No. 726,503
Term of patent 14 years
U.S. Cl. D32—45

330,789
COMBINED TRASH CAN AND CART THEREFOR
Barbara W. Powell, 1819 Huber Rd., Charleston, W. Va. 25314
Filed Oct. 19, 1990, Ser. No. 600,231
Term of patent 14 years
U.S. Cl. D34—5

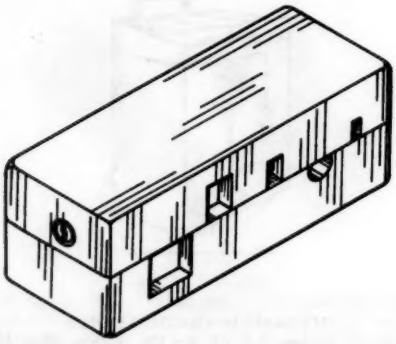


330,790
HYDRAULIC TRACTOR HOIST
Bradley W. Winings, R.R. #1, Box 124, Watkins, Minn. 55389
Filed Aug. 9, 1990, Ser. No. 564,952
Term of patent 14 years
U.S. Cl. D34—33

330,791
CARRIER FOR GLUE GUNS
William H. Benjamin, Bellflower, Calif., assignor to Benjamin Manufacturing, Co., Paramount, Calif.
Filed Jan. 6, 1989, Ser. No. 294,177
Term of patent 14 years
U.S. Cl. D34—43



330,792
ELECTRICAL CONNECTOR LOCK BOX
Steven C. Colley, 5767 Lakeville Rd., Orlando, Fla. 32818
Filed May 24, 1990, Ser. No. 528,187
Term of patent 14 years
U.S. Cl. D99—28



330,793
COMBINED MAILBOX AND SUPPORT
Ralph Hampton, 3837 Sheraton St., Winston-Salem, N.C. 27105
Filed Jan. 16, 1990, Ser. No. 464,779
Term of patent 14 years
U.S. Cl. D99—32

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 3RD DAY OF NOVEMBER, 1992

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Corporation: *See*—
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AB Volvo: *See*—
Svensson, Per; and Klippare, Sten, 5,160,519, Cl. 55-482.000.

ABB Vetco Gray Inc.: *See*—
Gariepy, James A., 5,160,172, Cl. 285-18.000.

Abbott Laboratories: *See*—
Brown, William E., III; Safford, Sarah E.; and Clemens, John M., 5,160,701, Cl. 422-56.000.
Mazer, Terrence B.; Meyer, Glenn A.; Hwang, Shie-Ming; Candler, Edrick L., Jr.; Drayer, Lonnie R.; and Daab-Krzykowski, Andre, 5,160,742, Cl. 424-469.000.

Abe, Naoto: *See*—
Saitoh, Kenji; Matsugu, Masakazu; and Abe, Naoto, 5,160,848, Cl. 250-548.000.

Abe, Tomoaki; Maeda, Katsuya; Hara, Mitsuo; Kamio, Shigeru; and Takao, Mitsunori. Wheel slippage control apparatus in motor vehicle. 5,159,990, Cl. 180-197.000.

Abe, Tooru: *See*—
Sakai, Yoshirou; Sadaoka, Yoshihiko; Matsuguchi, Masanobu; Kuroiwa, Takaaki; and Abe, Tooru, 5,161,085, Cl. 361-286.000.

Abileah, Adiel; Sherman, Charles; and Cammarata, Robert M., to OIS Optical Imaging Systems, Inc. Lighting assembly for a backlit electronic display including an integral image splitting and collimating means. 5,161,041, Cl. 359-40.000.

Abraham, Robert L., to International Business Machines Corporation. Resumeable batch query for processing time consuming queries in an object oriented database management system. 5,161,223, Cl. 395-600.000.

Abraham, Robert L.; and Priven, Michael P., to International Business Machines Corporation. Persistent stream for processing time consuming and reusable queries in an object oriented database management system. 5,161,225, Cl. 395-600.000.

AccuRate, Inc.: *See*—
Moksnes, Stephen L., 5,160,016, Cl. 198-533.000.

ACF Industries, Inc.: *See*—
Krug, John A.; Willis, William L.; Dumser, Paul J.; Casseau, William U.; Deet, William T.; Culligan, Laurence E.; and Walter, Bruce A., 5,159,882, Cl. 105-362.000.

Acheson Industries, Inc.: *See*—
Otaki, Shiro, 5,160,375, Cl. 106-475.000.

Ackerman, John P.: *See*—
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Acushnet Company: *See*—
Harris, Kevin M.; and Mydlack, Thomas L., 5,160,536, Cl. 106-19.00R.

Adachi, Osamu: *See*—
Tomiyama, Takamichi; Nara, Hitoshi; and Adachi, Osamu, 5,161,067, Cl. 359-824.000.

Adam, Klaus: *See*—
Klein, Hermann-Josef; Adam, Klaus; and Wuerth, Juergen, 5,159,912, Cl. 123-481.000.

Adams, John M.; Chance, Christopher N.; DeBlasio, James A.; Evers, Donald H.; Harris, William C., Jr.; Kirby, Michael A., Sr.; Newsome, Reginald W.; Pham, Xuan M.; and Talley, Robert E., to Philip Morris Incorporated. Two cartons joined as a single unit separable into two single cartons. 5,160,023, Cl. 206-256.000.

Adams, Roy E.: *See*—
Bania, Paul J.; Adams, Roy E.; and Stokes, James, 5,160,554, Cl. 148-407.000.

Adamski, Maximilian, Jr.; Ruderman, Stephen; and Tegel, Robert G., to Union Special Corporation. Aligning device for sleeve. 5,159,874, Cl. 112-262.300.

Addink, Marvin; Hu, Cheney Y.; Leyba, Todd; Mullen, John J.; Till, Carolyn A.; and Holmes, Andrew W., to International Business Machines Corporation. Method and apparatus for document image management in a case processing system. 5,161,214, Cl. 395-145.000.

Adelmann, Fred: *See*—
Pettigrew, Robert M.; Harry, Alan J.; Nailor, Paul R.; Adelmann, Fred; Franzen, Peter; and Schoon, Juergen, 5,160,943, Cl. 346-76.0PH.

Adinolfi, Raphael A. Sanitary equipment handler having magnetically held, detachable handle. 5,159,739, Cl. 16-114.00R.

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Tremulis, William S., 5,159,937, Cl. 128-772.000.

Advanced Magnetics Inc.: *See*—
Josephson, Lee; Groman, Ernest V.; and Palmacci, Stephen, 5,160,726, Cl. 424-9.000.

Advanced Micro Devices, Inc.: *See*—
Runaldue, Thomas J., 5,160,860, Cl. 307-482.000.

Advanced Surgical Intervention, Inc.: *See*—
Brenneman, Rodney A.; and Lenker, Jay A., 5,160,341, Cl. 606-198.000.

Aedi, Inc.: *See*—
Fishman, Udi; and Park, Harry, 5,160,068, Cl. 222-352.000.

Aeromix Systems, Incorporated: *See*—
Gross, Peter S.; Bollensen, Eric; and Rajendren, Richard, 5,160,667, Cl. 261-91.000.

Aerovox M, Inc.: *See*—
Clouse, James A.; and Melody, Brian J., 5,160,653, Cl. 252-62.200.

Ag-Bag Corporation: *See*—
Inman, Larry; and Koskela, Mike, 5,159,877, Cl. 100-144.000.

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Agha, Zahid: *See*—
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Agius, Michel: *See*—
Pernelle, Robert; and Agius, Michel, 5,160,524, Cl. 65-268.000.

Agrawal, Rakesh: *See*—
Kovak, Kenneth W.; Agrawal, Rakesh; and Peterson, Janice C., 5,159,816, Cl. 62-22.000.

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Burggraaf, Antonij J.; and Lin, Yue-Sheng, 5,160,618, Cl. 210-490.000.
Kovak, Kenneth W.; Agrawal, Rakesh; and Peterson, Janice C., 5,159,816, Cl. 62-22.000.

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Sugiura, Kiyohiko; Miki, Nobuaki; Nasu, Takeshi; Sugiura, Masayuki; and Saito, Masao, 5,160,116, Cl. 251-129.140.

Aisin Seiki Kabushiki Kaisha: *See*—
Mouri, Naoki; Hirao, Kouji; and Aoyama, Mutsuro, 5,160,162, Cl. 280-707.000.

Ajinomoto Co., Inc.: *See*—
Nagasaki, Yoshimi; Hashimoto, Takao; Takemura, Isao; Imai, Hiroshi; Hirama, Yasunobu; and Nakajima, Tadayoshi, 5,160,621, Cl. 210-614.000.

Akagawa, Minoru: *See*—
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Akaley, George E. Lighted display signs. 5,159,772, Cl. 40-545.000.

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Kosaka, Michitaka; Sasaki, Toshiro; Matsumoto, Kuniaki; Akashi, Kichizo; and Suemitsu, Satoru, 5,161,103, Cl. 364-408.000.

Akiyama, Hajime, to Mitsubishi Denki Kabushiki Kaisha. Insulated gate bipolar transistor. 5,160,985, Cl. 257-145.000.

Akiyama, Shin, to Fujitsu Limited; and Fujitsu VLSI Limited. Method of manufacturing a reticule. 5,161,114, Cl. 364-490.000.

Akiyama, Shunichiro; and Fujikawa, Hisao, to Nippon Stainless Steel Co., Ltd.; and Sumitomo Metal Industries, Ltd. Flexible tube for automotive exhaust systems. 5,160,389, Cl. 148-327.000.

Akzo Coatings, Inc.: *See*—
Waltrip, Donald W.; and Carter, Gordon, 5,160,766, Cl. 427-384.000.

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Wollbeck, Rudi; and Zang, Thomas, 5,160,673, Cl. 264-45.100.

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Carr, Robert J. G.; Clarke, David J.; and Al-Shukri, Sumaia, 5,160,976, Cl. 356-349.000.

Alagy, Jacques; Broutin, Paul; Busson, Christian; and Weill, Jerome, to Institut Francais du Petrole. Method for thermal conversion of methane and reactor for carrying out the method. 5,160,501, Cl. 585-500.000.

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Alborante, Giancarlo, to Comau SPA. Method and a device for checking fixtures used in machines or stations in production lines or installations. 5,159,844, Cl. 73-865.900.

Alcan International Limited: *See*—
Ball, Melville D.; Gallerneault, Christine E.; Hewitt, Bryan C.; and Lorenson, Claude P., 5,160,819, Cl. 219-10.55A.
Bell, David H.; Fortier, Joseph E. F.; and Havens, Haven M., 5,160,637, Cl. 210-766.000.

Alcatel Network Systems, Inc.: *See—*
Czerwiec, Richard M.; Tyrrell, Raymond E.; Sanders, Gus C.; Sutherland, Joseph E.; Sanders, Richard J., Jr.; Hurlocker, Claude M.; Thorne, Hal A.; Runyon, V. Paul; and Aro, Enn, 5,161,152, Cl. 370-84.000.

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Alcon Surgical, Inc.: *See—*
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Alden Laboratories, Inc.: *See—*
Drew, Terrence M.; Hanson, Chris A.; and Hanson, Alden B., 5,159,717, Cl. 2-20.000.

Aleshin, Stephen, to General Electric Company. Method for depositing material on the tip of a gas turbine engine airfoil using linear translational welding. 5,160,822, Cl. 219-121.640.

Alesis Corporation: *See—*
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Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nabo, Olle, 5,160,311, Cl. 494-56.000.
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Tramezzani, Giancarlo, 5,160,227, Cl. 411-278.000.

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Allan, Peter S.; and Bevis, Michael J., to National Research Development Corporation. Method for molding a material. 5,160,466, Cl. 264-69.000.

Allen, Don T. Orthopedic stabilizer attachment. 5,159,767, Cl. 36-27.000.

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Alliant Techsystems Inc.: *See—*
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Burch, Darrel W., 5,160,005, Cl. 192-42.000.
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Konicek, Jiri D.; Smith, Robert P.; and Zeroth, Jerry C., 5,160,567, Cl. 156-288.000.
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Allison, Joe D., to Conoco Inc. Micro-distillation process for cyanide. 5,160,413, Cl. 203-35.000.

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Anderson, Janeen D. W.; Mead, Carver A.; Allen, Timothy P.; and Wall, Michael F., to Synaptics, Incorporated. Adaptable MOS current mirror. 5,160,899, Cl. 330-288.000.

Anderson, Paul D.: *See—*
Allen, William E.; Anderson, Paul D.; Bradbury, Walter J.; Hadank, John M.; and League, Richard B., 5,160,239, Cl. 414-699.000.

Anderson, Steven A.: *See—*
Snetting, Mark E.; Anderson, Steven A.; Price, Scott D.; and Sutton, David L., 5,159,961, Cl. 141-10.000.

Andor Brush Company: *See—*
Newell, Robert L., 5,159,736, Cl. 15-195.000.

Andrew, Daniel E. Method and system for inserting spinal catheters. 5,160,323, Cl. 604-158.000.

Angerer, Werner: *See—*
Schur, Hans; Angerer, Werner; and Sprugel, Friedrich, 5,160,506, Cl. 44-308.000.

Anritsu Corporation: *See—*
Saeki, Hiroshi; and Motoyama, Hatsuo, 5,160,902, Cl. 331-117.00R.

Anthony, Vivienne; Clough, John M.; deFraine, Paul; Godfrey, Christopher; and Beautement, Kevin, to Imperial Chemical Industries PLC. Fungicides. 5,160,364, Cl. 71-92.000.

Antoon, Mitchell K., Jr., to Hercules Incorporated. Curable silicone-coated microporous films for controlled atmosphere packaging. 5,160,768, Cl. 428-35.200.

Aoi, Toshiki: *See—*
Namba, Kenryo; Shinkai, Masahiro; Tezuka, Sinichi; Inoue, Tetsushi; Aoi, Toshiki; and Takayama, Suguru, 5,161,150, Cl. 369-275.400.

Aoki, Shinji: *See—*
Suzuki, Hideto; Kurose, Yoshikazu; and Aoki, Shinji, 5,161,171, Cl. 375-108.000.

Aono, Takashi: *See—*
Matsuo, Makoto; Utsumi, Minoru; Ogusu, Chihaya; Mukasa, Shunsuke; Kudo, Yoshiaki; Obata, Hiroyuki; Aono, Takashi; Mohri, Hiroshi; Koike, Masato; Amano, Hideaki; and Saito, Norikazu, 5,161,233, Cl. 355-218.000.

Aoyagi, Toshitaka: *See—*
Shigihara, Kimio; Nagai, Yutaka; and Aoyagi, Toshitaka, 5,161,164, Cl. 372-20.000.

Aoyama, Koji: *See—*
Sagawa, Tetsuya; Aoyama, Koji; and Oshima, Muneo, 5,160,279, Cl. 439-595.000.

Aoyama, Mutsuro: *See—*
Mouri, Naoki; Hirao, Kouji; and Aoyama, Mutsuro, 5,160,162, Cl. 280-707.000.

Apple Computer, Inc.: *See—*
Fenwick, David, 5,161,245, Cl. 382-40.000.

Appliance Control Technology: *See—*
Crow, Chester H., 5,160,909, Cl. 335-128.000.

Applied Materials, Inc.: *See—*
Cheng, David, 5,160,402, Cl. 156-627.000.
Latchford, Ian S.; Vasquez, Patrica; Hemker, David J.; and Petit, Brigitte, 5,160,407, Cl. 156-656.000.
Maloney, James R.; and Moore, Joseph C., 5,160,545, Cl. 118-725.000.

Arahara, Kohzoh, to Canon Kabushiki Kaisha. Preparing optical memory medium by laminating a thermoplastic resin layer on a thermosetting resin sheet. 5,160,462, Cl. 264-1.300.

Arai, Tatsuo; Nakayama, Masaaki; and Saito, Takayoshi, to Mitsubishi Materials Corporation. Cutting tool with clamped-on inserts. 5,160,228, Cl. 407-32.000.

Arana Erana, D. Agustin. Core collecting tray provided with an in-built clipping system and adjustable cross travel allowing the core to be centered with the manipulator shaft. 5,159,867, Cl. 83-418.000.

Arbaugh, Robert P.: *See—*
Ertle, Raymond T.; and Arbaugh, Robert P., 5,160,660, Cl. 252-186.340.

Archer, Robert; and Duggin, Harold O., to Meco Corporation. Portable barbecue cooking grill. 5,159,917, Cl. 126-25.00R.

ARI Technologies, Inc.: *See—*
Hardison, Leslie C., 5,160,714, Cl. 423-220.000.

Arii, Mitsuzo: *See—*
Kondo, Osamu; Hirata, Masukazu; and Arii, Mitsuzo, 5,160,358, Cl. 65-18.200.

Arimoto, Akira: *See—*
Ohshima, Minoru; Morio, Shuichi; Saitoh, Susumu; Namikawa, Osamu; Obara, Kazutoshi; Seino, Minoru; Mochizuki, Takeshi; Nakura, Makoto; Arimoto, Akira; and Kasai, Masuo, 5,161,046, Cl. 359-212.000.

Arlt, Edward J., to LTV Energy Products Company. Variable spring rate riser tensioner system. 5,160,219, Cl. 405-195.100.

Armatron International, Inc.: *See—*
Cherry, James R.; Stevens, David P.; and Raynus, Abel, 5,160,927, Cl. 340-904.000.

Arnold, Evelyn J.: *See—*
Arnold, James W.; and Arnold, Evelyn J., 5,160,085, Cl. 238-366.000.

Arnold, James W.; and Arnold, Evelyn J. Railroad spike. 5,160,085, Cl. 238-366.000.

Arnold, Kurt; and Liell, Peter, to G. M. Pfaff Atkiengesellschaft. Device for stopping the drive of a sewing machine in the case of a thread disturbance. 5,159,890, Cl. 112-278.000.

Aro Corporation, The: *See—*
Thorp, Phil D.; and Sims, Stephen F., 5,159,987, Cl. 173-176.000.

Aro, Enn: *See—*
Czerwiec, Richard M.; Tyrrell, Raymond E.; Sanders, Gus C.; Sutherland, Joseph E.; Sanders, Richard J., Jr.; Hurlocker, Claude M.; Thorne, Hal A.; Runyon, V. Paul; and Aro, Enn, 5,161,152, Cl. 370-84.000.

Arthur D. Little Enterprises, Inc.: *See—*
Barron, Andrew R.; Cronin, Dennis F., Jr.; and Manson, Paul R., 5,159,983, Cl. 166-379.000.

Artpanel Consultant Co., Ltd.: *See—*
Yamaguchi, Kinichiro, 5,159,770, Cl. 40-156.000.

Arzonico, Barbara W.; Norman, Alan B.; and Gentry, Thomas L., to R. J. Reynolds Tobacco Company. Cigarette. 5,159,944, Cl. 131-365.000.

Asada, Hideo: *See—*
Etou, Ryoukichi; Hashizume, Kinji; Ikeda, Mitsuo; and Asada, Hideo, 5,159,818, Cl. 62-137.000.

Asahi Denka Kogyo Kabushiki Kaisha: *See—*
Hayashi, Toshihiro; Takeda, Satoru; Yamazaki, Shyoichiro; Sugie, Masayuki; and Iwaki, Norio, 5,160,754, Cl. 426-94.000.

Asahi Glass Company Ltd.: *See—*
Ono, Michio; Kume, Masaharu; and Matsuo, Takayuki, 5,160,780, Cl. 428-220.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Sugawara, Saburo, 5,160,192, Cl. 362-16.000.
Suzuki, Nobuharu; and Morisawa, Tahei, 5,160,954, Cl. 354-221.000.
Tanaka, Hitoshi; and Kikuchi, Katsumori, 5,161,066, Cl. 359-823.000.
Watanabe, Kenji; Sekiguchi, Tetsuo; and Shishido, Takayasu, 5,160,956, Cl. 354-286.000.

Asahina, Takashi: *See—*
Yoshida, Tsutomu; Inoue, Toshinori; Shirasawa, Toshihiko; and Asahina, Takashi, 5,160,479, Cl. 266-233.000.

Asakura, Tsutou: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Koyama, Yoshihisa; and Uchiyama, Yuji, 5,161,007, Cl. 358-43.000.

Asano, Kuniyoshi; Uemura, Tomoyoshi; and Takida, Hiroshi, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Method of producing shaped articles having excellent impact resistance. 5,160,475, Cl. 264-331.170.

Asano, Shinya: *See—*
Naito, Hisatsugu; and Asano, Shinya, 5,160,204, Cl. 400-208.000.

Ascough, Michael R., to Du Pont Canada Inc. Process and apparatus for extraction and recovery of blowing agents from polymeric foams. 5,160,354, Cl. 55-37.000.

Ash, Kenneth C.; Crocker, William A.; Haygarth, John C.; Lee, David R.; Morris, Donald; Peterson, John R.; Riesen, Jon A.; and Yih, Robert S., to Teledyne Industries, Inc. Zirconium-hafnium separation and purification process. 5,160,482, Cl. 423-75.000.

Ashby, Clifford T.: *See—*
Ashby, Michael L.; and Ashby, Clifford T., 5,160,566, Cl. 156-252.000.

Ashby, Michael L.; and Ashby, Clifford T. Decorative glass block. 5,160,566, Cl. 156-252.000.

Asher, Thomas L.: *See—*
Hampton, John R.; and Asher, Thomas L., 5,160,442, Cl. 210-791.000.

Ashley, Paul; and Chapman, John U., to Clark Door Limited. Improvements in and relating to roller doors. 5,159,967, Cl. 160-265.000.

Askoll S.p.A.: *See—*
Marioni, Elio, 5,160,431, Cl. 210-169.000.

Aster, Inc.: *See—*
Gerace, Michael J.; and Gerace, Janet M., 5,160,628, Cl. 210-667.000.

Atkinson, Gary B.; Kuczynski, Robert J.; and Desmond, Dennis P., to United States of America, Interior. Cyanide leaching method for recovering platinum group metals from a catalytic converter catalyst. 5,160,711, Cl. 423-22.000.

Atkinson, Peter. Cabinet mounting apparatus. 5,160,126, Cl. 269-102.000.

Atlanta Attachment Company: *See—*
Price, Elvin C.; and Dasher, Preston B., 5,159,889, Cl. 112-269.100.

Atlantic Richfield Company: *See—*
Dorchak, Wayne A., 5,161,110, Cl. 364-468.000.
Petermann, Steven G., 5,160,814, Cl. 181-106.000.

Atomic Skifabrik Alois Rohrmoser: *See—*
Scherubl, Franz, 5,160,158, Cl. 280-610.000.

Aton, Thomas J.: *See—*
Mahant-Shetti, Shivaling S.; Aton, Thomas J.; and Gale, Rebecca J., 5,159,752, Cl. 29-846.000.

Atriss, Ahmad H.: *See—*
Parker, Lanny L.; Atriss, Ahmad H.; and Mueller, Dean W., 5,161,175, Cl. 377-70.000.

Aubry, Jean; Teton, Andre; and Tessier, Jean-Paul, to Stein Industrie. Arrangement for supporting and guiding a cyclone skirt in a boiler having a circulating fluidized bed. 5,160,516, Cl. 55-269.000.

Aumann, Hans, to W. L. Gore & Associates, Inc. Waterproof garment. 5,159,719, Cl. 2-87.000.

Automated Storage & Retrieval Systems of America: *See—*
Johnston, Daniel J.; and Cleven, Russell, 5,160,189, Cl. 312-201.000.

Automated Storage & Retrieval Systems of America Inc.: *See—*
Farrell, Richard B.; and Orlowski, David P., 5,160,190, Cl. 312-201.000.

Automatic Switch Company: *See—*
Wiktor, Dominik M.; and Schlindwein, Siegfried, 5,160,817, Cl. 200-146.00R.

Automation International, Inc.: *See—*
Cole, Ronald D., 5,160,079, Cl. 228-212.000.

Avidan, Amos A., to Mobil Oil Corporation. Process and apparatus for indirect heating of catalyst stripper above a bubbling bed catalyst regenerator. 5,160,426, Cl. 208-113.000.

AVL Medical Instruments AG: *See—*
Marsoner, Hermann; and Ruther, Horst, 5,160,420, Cl. 204-433.000.

Awotwi, Samuel A.: *See—*
Fischer, Kurt F.; and Awotwi, Samuel A., 5,160,164, Cl. 280-743.000.

Azumatani, Yasushi: *See—*
Fukushima, Yoshihisa; Satoh, Isao; Takagi, Yuji; Azumatani, Yasushi; and Hamasaka, Hiroshi, 5,161,143, Cl. 369-53.000.

B. F. Goodrich Company, The: *See—*
Hlavac, Kenneth A., 5,160,102, Cl. 244-134.00A.

Babbitt, Richard W.; and Stern, Richard A., to United States of America, Army. Microstrip circuit with transition for different dielectric materials. 5,160,904, Cl. 333-34.000.

Babcock & Wilcox Company, The: *See—*
Womack, Robert E., 5,159,849, Cl. 74-502.300.

Babel, Werner, to MAHO Aktiengesellschaft. Machine tool for laser-beam machining of workpieces. 5,160,824, Cl. 219-121.680.

Babock-Bsh AG: *See—*
Bold, Jorg, 5,160,411, Cl. 162-398.000.

Back, Lloyd: *See—*
Shakkottai, Parthasarathy; Kwack, Eug Y.; and Back, Lloyd, 5,159,843, Cl. 73-24.050.

Bacques, Jean-Yves; and Coalier, Guy, to Otor. Machine for making a tapering carton. 5,160,307, Cl. 493-176.000.

Badstieber, Johann, to Maier, Josef. Formwork panel. 5,160,640, Cl. 249-189.000.

Bae, Jong-Chan, to Dongyang Jonghap Corporation. Film-to-tape transfer apparatus. 5,160,948, Cl. 352-1.000.

Baggio, Giorgio: *See—*
Gorza, Roberto; Baggio, Giorgio; and Battistella, Mirco, 5,160,159, Cl. 280-632.000.

Bailey, Daryl K. Refuse receptacle. 5,160,063, Cl. 220-404.000.

Bajeux, Paul; and Dunand, Alain, to Imaje S.A. Device for controlling and regulating an ink and processing thereof in a continuous ink jet printer. 5,160,939, Cl. 346-75.000.

Baker, Paul N.; Messineo, Michael C.; and Valencic, Milo J. Tool and method for handling collectable cards. 5,159,964, Cl. 150-147.000.

Balakrishnan, Balu, to Power Integrations, Inc. High frequency switched mode converter. 5,161,098, Cl. 363-144.000.

Baldwin, Roger A.: *See—*
Owen, S. Hudson; Baldwin, Roger A.; Taylor, Gerald E.; and Wolff, Paul A., 5,160,084, Cl. 238-310.000.

Baliko, Gabriella: *See—*
Lukacsovich, Tamas; Venetianer, Pal; Gaal, Tamas; Boros, Imre; and Baliko, Gabriella, 5,160,489, Cl. 435-172.300.

Ball, Francois-Xavier: *See—*
Savall, Vincent; and Ball, Francois-Xavier, 5,160,705, Cl. 422-140.000.

Ball, Melville D.; Gallernesult, Christine E.; Hewitt, Bryan C.; and Lorenson, Claude P., to Alcan International Limited. Microwave tunnel oven having means for generating higher order modes in loads. 5,160,819, Cl. 219-10.55A.

Balsells, Joan C.: *See—*
Balsells, Peter J., 5,160,122, Cl. 267-167.000.

Balsells, Peter J., to Balsells, Peter J.; and Balsells, Joan C. Coil spring with an elastomer having a hollow coil cross section. 5,160,122, Cl. 267-167.000.

Bandel, Gebhard: *See*—
Schaub, Georg; Bandel, Gebhard; Reimert, Rainer; and Beisswenger, Hans, 5,159,886, Cl. 110-347.000.

Bando Chemical Industries, Ltd.: *See*—
Nakanishi, Yasuyuki; and Matsuoka, Hiroshi, 5,160,301, Cl. 474-263.000.

Bania, Paul J.; Adams, Roy E.; and Stokes, James, to Titanium Metals Corporation. Alpha-beta titanium-base alloy and fastener made therefrom. 5,160,554, Cl. 148-407.000.

Bannai, Kazunori: *See*—
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.

Bannon, John H. Ultrasonic parts cleaning apparatus. 5,159,945, Cl. 134-85.000.

Banura, George A.; and Noland, Richard L. Radar target simulator. 5,160,264, Cl. 434-2.000.

Barachet, Jacques. Skateboard having two wheels in tandem. 5,160,155, Cl. 280-87.042.

Barbee, Robert B.; and Phillips, Brian S., to Eastman Kodak Company. Thermosetting powder coating compositions. 5,160,792, Cl. 428-480.000.

Barcus, Robert L.; and Bjorkquist, David W., to Procter & Gamble Co., The. Fibers and pulps for papermaking based on chemical combination of poly(acrylate-co-itaconate), polyol and cellulosic fiber. 5,160,789, Cl. 428-361.000.

Barnette, Stuart M. Cooling system filter. 5,160,427, Cl. 210-95.000.

Barr, Keith, to Alesis Corporation. Microphone. 5,161,200, Cl. 381-173.000.

Barre, Claude, to Siemens Aktiengesellschaft. Integratable transistor switch unit of the NTL logic family. 5,160,857, Cl. 307-446.000.

Barrette, Michael G.: *See*—
Saposnik, Fabio J.; and Barrette, Michael G., 5,160,918, Cl. 340-709.000.

Barron, Andrew R.; Cronin, Dennis F., Jr.; and Manson, Paul R., to Arthur D. Little Enterprises, Inc. Apparatus and method for capping oil or gas wells. 5,159,983, Cl. 166-379.000.

Barron, Charles D.: *See*—
Dailey, Patrick E.; Barron, Charles D.; and Rorden, Louis H., 5,160,925, Cl. 340-853.300.

Bartholomew, Donald D., to Proprietary Technology, Inc. Shock absorbing compressional mounting apparatus. 5,160,121, Cl. 267-136.000.

Basf Aktiengesellschaft: *See*—
Mayer, Horst; Hamprecht, Gerhard; Westphalen, Karl-Otto; Walter, Helmut; and Gerber, Matthias, 5,160,365, Cl. 71-93.000.

Basse, Hartwig; and Wittek, Jurgen, to Norddeutsche Seekabelwerk. Method of manufacturing biological water treatment contact material. 5,160,395, Cl. 156-269.000.

Bateman, James. Packframe with diagonally suspended pack. 5,160,073, Cl. 224-210.000.

Battaglia, John J. Multi-mode watering apparatus. 5,160,093, Cl. 239-444.000.

Battistella, Mirco: *See*—
Gorza, Roberto; Baggio, Giorgio; and Battistella, Mirco, 5,160,159, Cl. 280-632.000.

Battles, James E.: *See*—
Pierce, R. Dean; Ackerman, John P.; Battles, James E.; Johnson, Terry R.; and Miller, William E., 5,160,367, Cl. 75-397.000.

Baudin, Florent: *See*—
Moreau, Alain; and Baudin, Florent, 5,159,948, Cl. 135-104.000.

Bauer, Frank: *See*—
Genske, Roger P.; and Bauer, Frank, 5,160,767, Cl. 428-35.980.

Baum, Randon L.: *See*—
Siriporn, Charn; Milcarek, Charles S., Jr.; Norman, Ronald J.; Baum, Randon L.; and Holecek, Michael G., 5,160,129, Cl. 271-178.000.

Baum, Richard I.; Brotman, Charles H.; and Rymarczyk, James W., to International Business Machines Corporation. Multiprocessing packet switching connection system having provision for error correction and recovery. 5,161,156, Cl. 371-7.000.

Baumgartner, Peter: *See*—
Weiss, Gerhard; and Baumgartner, Peter, 5,160,088, Cl. 239-88.000.

Baxter International Inc.: *See*—
Emery, Jamie; and Montgomery, Horace, 5,160,319, Cl. 604-27.000.

Bayer Aktiengesellschaft: *See*—
Hoppe, Manfred; Wiegner, Dieter; Sagner, Klaus-Peter; Jordan, Heinz D.; and Brandt, Horst, 5,160,348, Cl. 8-639.000.

Bazemore, Jeffrey T.: *See*—
Ott, Michael J.; Bazemore, Jeffrey T.; and Brogley, Mark E., 5,160,569, Cl. 156-439.000.

Beales, Jonathan T., to International Paper Company. Locking trays. 5,160,081, Cl. 229-114.000.

Beaman, Donald R.: *See*—
Pyzik, Aleksander J.; Rossow, Harold E.; Schwarz, Douglas B.; Beaman, Donald R.; Pyzik, Barbara M.; and Dubensky, William J., 5,160,508, Cl. 51-307.000.

Bear Automotive Service Equipment Company: *See*—
Makhija, Surender K.; Sparacino, Steven J.; and Burgess, Robert T., 5,160,892, Cl. 324-379.000.

Beautement, Kevin: *See*—
Anthony, Vivienne; Clough, John M.; deFraine, Paul; Godfrey, Christopher; and Beautement, Kevin, 5,160,364, Cl. 71-92.000.

Beckenbaugh, William M.: *See*—
Moore, Kevin D.; Stafford, John W.; Beckenbaugh, William M.; and Cholewczynski, Ken, 5,160,409, Cl. 156-656.000.

Becraft, Lloyd G.; and Nanni, Edward J., to Conoco Inc. Process for producing isotropic coke. 5,160,602, Cl. 208-131.000.

Begovich, Juan A. Biodegradable packages for fast food and method of preparing the same. 5,160,368, Cl. 106-154.100.

Beisswenger, Hans: *See*—
Schaub, Georg; Bandel, Gebhard; Reimert, Rainer; and Beisswenger, Hans, 5,159,886, Cl. 110-347.000.

Bekkers, Marinus F. L., to C. C. M. Beheer B.V. Device for forming a cut in breast and belly of a slaughtered animal carcass. 5,160,295, Cl. 452-160.000.

Bell, Bret: *See*—
Rohe, Fred P.; and Bell, Bret, 5,160,221, Cl. 405-270.000.

Bell, David H.; Fortier, Joseph E. F.; and Havens, Haven M., to Alcan International Limited. Apparatus and method for hydrolysis of cyanide-containing liquids. 5,160,637, Cl. 210-766.000.

Bell, Ronald D.; Gardiner, William C.; Howell, John R.; Matthews, Ronald D.; and Nichols, Steven P., to Radian Corporation and the Board of Regents; and University of Texas System, The. Apparatus and method for combustion within porous matrix elements. 5,160,254, Cl. 431-7.000.

Bellezza, Orio, to SGS-Thomson Microelectronics s.r.l. Matrix of EPROM memory cells with a tablecloth structure having an improved capacitative ratio and a process for its manufacture. 5,160,986, Cl. 257-316.000.

Beloit Corporation: *See*—
Eaton, Daniel J.; and Kanitz, Roger A., 5,160,583, Cl. 162-301.000.

Beloit Technologies, Inc.: *See*—
Fredriksson, Borje, 5,160,584, Cl. 162-318.000.

Beltzer, Morton: *See*—
Habeeb, Jacob J.; and Beltzer, Morton, 5,160,644, Cl. 252-32.70E.

Benczur-Urmossy, Gabor: *See*—
von Benda, Klaus; and Benczur-Urmossy, Gabor, 5,160,659, Cl. 252-182.100.

Bend Research, Inc.: *See*—
Newbold, David D.; and Colton, Raymond H., 5,160,514, Cl. 55-158.000.

Benedict, Ray B. Bathtub. 5,159,723, Cl. 4-584.000.

Bengtsson, Alf: *See*—
Josefsson, Par; and Bengtsson, Alf, 5,160,097, Cl. 242-47.010.

Bennin, Jeffry S.; and Dustrude, Mark O., to Hutchinson Technology, Inc. Moving mask laser imaging. 5,160,823, Cl. 219-121.680.

Bennis, Gary: *See*—
Bennis, Gary L.; and Burlingame, Anthony M., 5,159,774, Cl. 43-17.500.

Bennis, Gary L.; and Burlingame, Anthony M., to Bennis, Gary. Marker for fishing rig. 5,159,774, Cl. 43-17.500.

Benz & Hilgers GmbH: *See*—
Bohm, Jurgen, 5,159,959, Cl. 141-1.000.

Benz, Mark G.; and Sawyer, Thomas F., to General Electric Company. Direct processing of electroslag refined metal. 5,160,532, Cl. 75-10.240.

Beran, James T. Modular self-programmer. 5,161,232, Cl. 395-800.000.

Berema Aktiebolag: *See*—
Jakobsson, Gunnar S., 5,159,814, Cl. 60-542.000.

Berg, Lloyd, to Berg, Lloyd. Dehydration of acetic acid by azeotropic distillation. 5,160,412, Cl. 203-16.000.

Berg, Lloyd, to Berg, Lloyd. Separation of tetrachloroethylene from a butyl alcohol by extractive distillation. 5,160,585, Cl. 203-57.000.

Berger, Josef: *See*—
Nazarathy, Moshe; Berger, Josef; and Kagan, Yishai, 5,161,044, Cl. 359-157.000.

Bergman, Elliot: *See*—
Misselbrook, John; Hoff, Edwin F., Jr.; Bergman, Elliot; McKinney, Larry J.; and LeFiles, James H., 5,160,530, Cl. 71-121.000.

Bergren, Orton D.: *See*—
Parkinson, Dean B.; and Bergren, Orton D., 5,160,369, Cl. 106-19.00R.

Berry, Sharon L.: *See*—
Halsey, Carl C.; and Berry, Sharon L., 5,160,468, Cl. 264-112.000.

Bertagna, Richard W.: *See*—
Kirkpatrick, Steven J.; Bertagna, Richard W.; and Gutwein, Roger W., 5,160,757, Cl. 426-466.000.

Berthiaume, Marianne; and Jachowicz, Janusz, to Clairol Inc. Conditioning compositions with perfluoropolymethylisopropylethers. 5,160,733, Cl. 424-71.000.

Berthier, Jean-Marc: *See*—
Jaillet, Bernard; and Berthier, Jean-Marc, 5,160,485, Cl. 428-116.000.

Berti, Franco. Halogen lamp reflector including a ceramic material paraboloid light reflecting element. 5,160,199, Cl. 362-346.000.

Bertiger, Bary R.; Leopold, Raymond J.; and Peterson, Kenneth M., to Motorola, Inc. Method of predicting cell-to-cell hand-offs for a satellite cellular communications system. 5,161,248, Cl. 455-17.000.

Berwick Manufacturing Inc.: *See*—
Palisin, Stephen P., Jr.; and Keller, Raymond J., 5,160,031, Cl. 206-519.000.

Besombes, Alain, to Alsthom Fluides Sapag. Bottom-of-vat valve. 5,160,117, Cl. 251-144.000.

Best, Donald F.: *See*—
Vasilakis, James G.; Best, Donald F.; Skeels, Gary W.; and Flanigen, Edith M., 5,160,033, Cl. 208-111.000.
Best Power Technology, Inc.: *See*—
Hubert, Thomas G.; Stich, Frederick A.; Hazen, William J.; and Mills, Ricky, 5,160,832, Cl. 235-145.00R.
Bevis, Michael J.: *See*—
Allan, Peter S.; and Bevis, Michael J., 5,160,466, Cl. 264-69.000.
Bikow, Nikolaus, to Visser's-Gravendeel Holding B.V. Apparatus for relocating arranged plants. 5,160,235, Cl. 414-416.000.
Bikson, Benjamin; and Giglia, Salvatore, to Praxair Technology, Inc. Double ended hollow fiber bundle and fluids separation apparatus. 5,160,042, Cl. 210-321.800.
Billings, R. Gail; Wallace, William D.; Cutler, Christopher A.; and Cook, B. Tod, to Utah Medical Products, Inc. Electrosurgical generator and suction apparatus. 5,160,334, Cl. 606-34.000.
Bingold, Richard F. X. Two-loop law enforcement strap restraint which is concealable, disposable and can be formed entirely of recyclable material. 5,159,728, Cl. 24-16.0PB.
Binkley, David: *See*—
Reps, Thomas; Horwitz, Susan; and Binkley, David, 5,161,216, Cl. 395-375.000.
Binsteld, Michael A., to Illinois Tool Works, Inc. Tearing slit arrangement for a tear-apart package. 5,160,030, Cl. 206-497.000.
Bio Pit Co., Ltd.: *See*—
Mabuchi, Seiya; and Katsunuma, Tatsuo, 5,159,922, Cl. 128-52.000.
Bires, Carmen D.: *See*—
Login, Robert; Bires, Carmen D.; and Walls, Edward W., Jr., 5,160,729, Cl. 424-47.000.
Birnbaum, David, to Xerox Corporation. Color image processing apparatus for substituting a black pigment for improved black copying. 5,161,010, Cl. 358-79.000.
Bischofberger, Jurg: *See*—
Oehler, Reinhard; Meyer, Urs; and Bischofberger, Jurg, 5,161,111, Cl. 364-470.000.
Bischoff, Daniel R.: *See*—
Faiks, Frederick S.; Anderson, Craig M.; and Bischoff, Daniel R., 5,160,184, Cl. 297-304.000.
Bissell Healthcare Co.: *See*—
Peters, Helena, 5,160,314, Cl. 602-21.000.
BJ Services Company: *See*—
Dawson, Jeffrey C., 5,160,643, Cl. 252-8.551.
Bjorkquist, David W.: *See*—
Barcus, Robert L.; and Bjorkquist, David W., 5,160,789, Cl. 428-361.000.
Black & Decker, Inc.: *See*—
Hoser, Jurgen, 5,159,986, Cl. 173-48.000.
Snetting, Mark E.; Anderson, Steven A.; Price, Scott D.; and Sutton, David L., 5,159,961, Cl. 141-10.000.
Black, Gregory R., to Motorola, Inc. Power amplifier. 5,160,898, Cl. 330-284.000.
Blackburn, Brian K.: *See*—
Gentry, Scott B.; Mazur, Joseph F.; and Blackburn, Brian K., 5,159,773, Cl. 43-17.100.
Blake-Coleman, B. C., to Public Health Laboratory Service Board. Filtering apparatus. 5,160,616, Cl. 210-321.840.
Blanz, John H., to John H. Blanz Company, Inc. Test station having vibrationally stabilized X, Y and Z movable integrated circuit receiving support. 5,160,883, Cl. 324-158.00F.
Blaw Knox Food and Chemical Equipment Co., Inc.: *See*—
Wireman, Jack; and Wireman, Daniel R., 5,159,764, Cl. 34-57.00E.
Blechschmidt, Wolf J. Rotating window. 5,161,055, Cl. 359-508.000.
Bley, Robert S.: *See*—
Condon, Dennis E.; Bley, Robert S.; and Pukait, Bobby, 5,159,920, Cl. 128-6.000.
Bloch, Gerard; and Loeb, Jean, to CESA - Compagnie Europeenne de Sieges pour Automobiles. Controlled-rigidity supporting element. 5,159,726, Cl. 5-453.000.
Bloom, Melvin R. Apparatus and method for preserving a marksmanship target score. 5,160,133, Cl. 273-408.000.
Board of Trustees, Leland Stanford Jr. University: *See*—
Schellenberg, Franklin M., 5,161,039, Cl. 359-3.000.
Board of Trustees operating Michigan State University: *See*—
Pinnavaia, Thomas J.; Polansky, Christine A.; and Amarasekera, Jayantha, 5,160,715, Cl. 423-244.080.
BOC Group, Inc., The: *See*—
Toppel, Karl O., 5,160,355, Cl. 55-269.000.
Yap, Loo T., 5,160,458, Cl. 261-76.000.
BOC Group plc, The: *See*—
Garrett, Michael E., 5,160,769, Cl. 428-36.500.
Boehringer Mannheim Corp.: *See*—
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,979, Cl. 356-423.000.
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Schlipfenbacher, Reiner; Mangold, Dieter; Lerch, Rolf; and Steinbiss, Joachim, 5,160,486, Cl. 422-56.000.
Boeing Company, The: *See*—
Braun, John P.; Goodman, Sperry H.; and Carlson, Richard W., 5,160,936, Cl. 343-725.000.
Bull, James G., 5,160,932, Cl. 342-25.000.
Chakravarty, Abhijit J.; and Nakamura, Yoshiki, 5,161,158, Cl. 371-15.100.
Faville, Paul E., 5,160,978, Cl. 356-394.000.
Hinckley, C. Douglas, 5,159,865, Cl. 83-16.000.
Narayanan, G. Hari; and Quist, William E., 5,160,555, Cl. 148-417.000.
Bohler Gesellschaft m.b.H.: *See*—
Leban, Karl; and Schweiger, Herbert, 5,160,553, Cl. 148-318.000.
Bohm, Jurgen, to Benz & Hilgers GmbH. Double feedback packing system for pasty material. 5,159,959, Cl. 141-1.000.
Boisture, Thomas B., to Ohmstede Mechanical Services, Inc. Method for cleaning tube bundles using a slurry. 5,160,548, Cl. 134-7.000.
Boitiaux, Jean-Paul: *See*—
Juguin, Bernard A.; Boitiaux, Jean-Paul; and Martino, Germain J., 5,160,497, Cl. 568-798.000.
Bokhagen, Bernt, to Lyckplay AB. Apparatus and method of playing a board game. 5,160,145, Cl. 273-260.000.
Bold, Jorg, to Babock-Bsh AG. Installation for producing panel-shaped articles from a mixture of plaster and fibrous material. 5,160,411, Cl. 162-398.000.
Bolduc, Lee R.: *See*—
Neuwirth, Robert S.; and Bolduc, Lee R., 5,159,925, Cl. 128-401.000.
Bolikal, Durgadas: *See*—
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Bollensen, Eric: *See*—
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Bontrager, Rick L., to Great Western Foam Products Corporation. Method of manufacturing foam packaging frame blank. 5,160,473, Cl. 264-138.000.
Boomer, John: *See*—
Burgher, Peter H.; and Boomer, John, 5,161,088, Cl. 361-383.000.
Boos, Margareta: *See*—
Buhler, Ulrich; Kuhn, Reinhard; and Boos, Margareta, 5,160,495, Cl. 534-854.000.
Borchardt, Robert L.; and Schotz, Larry, to Recoton, Inc. In line switchable audio enhancement device for CD adapter. 5,161,131, Cl. 369-1.000.
Borgstrom, Leonard: *See*—
Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nabo, Olle, 5,160,311, Cl. 494-56.000.
Borland, James E.: *See*—
Smith, Kim R.; Borland, James E.; Crutcher, Terry; and Sauer, Joe D., 5,160,658, Cl. 252-174.190.
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Bortolotti, Fabrizio; Pietrantoni, Luciano; Swinkels, Petrus L. J.; and Waas, Marco, to Lever Brothers Company, Division of Conopo, Inc. Detergent compositions and process for preparing them. 5,160,657, Cl. 252-174.140.
Bosiger, Peter: *See*—
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Bossen, Douglas C.; Chen, Chin-Long; and Hsiao, Mu-Yue, to International Business Machines Corporation. Method and apparatus for providing error correction to symbol level codes. 5,161,163, Cl. 371-54.000.
Bosworth, Mark E.; Dunn, Thomas J.; Hall, Warren E.; Johnson, Richard G.; Kneller, Mills T.; Lin, Youlin; Wallace, Rebecca A.; White, David H.; and Wong, David M., to Mallinckrodt Medical, Inc. Purification of crude loversol using reverse osmosis. 5,160,437, Cl. 210-651.000.
Bouchard, Arthur, II: *See*—
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Boulay, Peter C. Automated repeating sextant (ARS). 5,161,242, Cl. 364-455.000.
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Braatben, Russell E., to NovAtel Communications, Ltd. Active filtering mixer. 5,161,254, Cl. 455-306.000.
Bradbury, Walter J.: *See*—
Allen, William E.; Anderson, Paul D.; Bradbury, Walter J.; Hadank, John M.; and League, Richard B., 5,160,239, Cl. 414-699.000.
Bragg, Joseph A., to Alcon Surgical, Inc. Vaulted intraocular lens having curved slanted haptic. 5,160,345, Cl. 623-6.000.
Braginsky, Sidney: *See*—
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Braig, James R.: *See*—
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Brancel, Dale H.; Freitas, Michael W.; and Zierhut, Clarence D., to Dexide, Inc. Surgical instruments handle and forceps assembly. 5,160,343, Cl. 606-205.000.
Brand, Hans-Wolfgang; Klee, Mareike K.; De Vries, Johan W. C.; Waser, Rainer M.; and Wolters, Robertus A. M., to U.S. Philips Corporation. Method of manufacturing mono-layer capacitors. 5,160,762, Cl. 427-79.000.
Brandon, Ralph J.: *See*—
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Brandt, Horst: *See—*
Hoppe, Manfred; Wiegner, Dieter; Sagner, Klaus-Peter; Jordan, Heinz D.; and Brandt, Horst, 5,160,348, Cl. 8-639.000.

Braun Aktiengesellschaft: *See—*
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Braun, John P.; Goodman, Sperry H.; and Carlson, Richard W., to Boeing Company, The. Multiband shared aperture array antenna system. 5,160,936, Cl. 343-725.000.

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Breitenstein, George T. Bag holder. 5,160,103, Cl. 248-100.000.

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Bricker, James C.; Ebbeler, Robert E.; and Roseman, Michael R., to Diversey Corporation. Detergent dispensing system. 5,160,709, Cl. 422-263.000.

Bridges, William L.: *See—*
Whitt, Riley S.; Bridges, William L.; and Johnson, Marshall L., 5,159,734, Cl. 15-883.000.

Bridgestone Corporation: *See—*
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Bright, Michael W.: *See—*
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Brinkley, Paul A.; Brown, Thomas W.; Flinchum, Jack G., Jr.; Perfetti, Thomas A.; Thomasson, James S.; and Young, Harvey J., to R. J. Reynolds Tobacco Company. Process for providing smokable material for a cigarette. 5,159,942, Cl. 131-298.000.

Brite-O-Matic Manufacturing, Inc.: *See—*
Gasser, William J.; Carco, Timothy J.; and Justin, Anthony J., 5,160,430, Cl. 210-138.000.

British Aerospace Public Limited Company: *See—*
Fairlie, Robert H.; and Stirland, Simon J., 5,160,937, Cl. 343-781.00P.

British Gas plc: *See—*
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Brodie, Eugene L.: *See—*
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Brogley, Mark E.: *See—*
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Brother Kogyo Kabushiki Kaisha: *See—*
Morita, Tetsuo, 5,159,888, Cl. 112-121.120.
Muramatsu, Kiyoji, 5,161,035, Cl. 358-451.000.
Takagi, Yukihito; Imamaki, Teruo; Nakata, Shigeru; and Sakuma, Mikio, 5,160,573, Cl. 156-510.000.

Brotman, Charles H.: *See—*
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Broutin, Paul: *See—*
Alagy, Jacques; Broutin, Paul; Busson, Christian; and Weill, Jerome, 5,160,501, Cl. 585-500.000.

Brown, Adria. Method for removing oil spills using a natural, recyclable absorbent. 5,160,629, Cl. 210-671.000.

Brown, Edward J.: *See—*
Stillman, Neil W.; and Brown, Edward J., 5,160,525, Cl. 71-64.100.

Brown, Marvin A., to F.B. Leopold Company, Inc., The. Air duct block for air/water underdrain systems in gravity filters. 5,160,614, Cl. 210-275.000.

Brown, Ronald E.: *See—*
Lee, Fu-Ming; Hair, Robert L.; and Brown, Ronald E., 5,160,414, Cl. 203-57.000.

Brown, Thomas W.: *See—*
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Brown, William E., III; Safford, Sarah E.; and Clemens, John M., to Abbott Laboratories. Solid-phase analytical device and method for using same. 5,160,701, Cl. 422-56.000.

Brown, William M., to Environmental Research Institute of Michigan. Interferometric synthetic aperture detection of sparse non-surface objects. 5,160,931, Cl. 342-25.000.

Brown, Wilmott G., to Westinghouse Electric Corp. Freestanding mixed tuned steam turbine blade. 5,160,242, Cl. 416-193.00A.

Bruder, John F.; and Swink, Laurence N., to Quadri Electronics Corporation. Solid electrolyte capacitor and method of making. 5,161,094, Cl. 361-502.000.

Bruker Instruments, Inc.: *See—*
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Brunclik, Vaclav: *See—*
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Brunswick Biomedical Technologies, Inc.: *See—*
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Brustle, Klaus; Tofferl, Andreas; and Rock, Erich, to Julius Blum Gesellschaft m.b.H. Hinge with spring coupling member. 5,159,740, Cl. 16-258.000.

BSRD Limited: *See—*
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Buchanan, William L.: *See—*
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Buckeye Manufacturing Company: *See—*
Shafer, Richard L.; and Mackall, Allen E., 5,159,825, Cl. 72-111.000.

Buckley, B. Shawn. Self-organizing circuits. 5,161,203, Cl. 382-15.000.

Budd Company, The: *See—*
Vancsik, Frank J., 5,159,754, Cl. 29-898.070.

Budde, Volker, to Carl Freudenberg, Firma. Hydraulic valve lifter. 5,159,907, Cl. 123-90.550.

Buhler, Ulrich; Kuhn, Reinhard; and Boos, Margareta, to Cassella Aktiengeselischaft. 2-cyano-4,6-dimitro-phenyl monoazo dyestuffs. 5,160,495, Cl. 534-854.000.

Buil, Boudewijn J. A. M.: *See—*
Hauzer, Fransiscus J. M.; Munz, Wolf-Dieter; Buil, Boudewijn J. A. M.; Schulze, Dietmar; and Tietema, Roel, 5,160,595, Cl. 204-192.380.

Bull HN Information Systems Inc.: *See—*
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Bull, James G., to Boeing Company, The. Over-the-horizon synthetic aperture radar. 5,160,932, Cl. 342-25.000.

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Rorke, A. Brooks; Bullwinkle, Wallace C.; Stephens, William I.; Reuter, Robert E.; and Rizzi, John J., 5,160,188, Cl. 312-196.000.

Burch, Darrel W., to Allied-Signal Inc. Pawl and ratchet clutch with torsion shaft. 5,160,005, Cl. 192-42.000.

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Burggraaf, Antonij J.; and Lin, Yue-Sheng, to Air Products and Chemicals, Inc. Method for manufacturing ultrathin inorganic membranes. 5,160,618, Cl. 210-490.000.

Burgher, Peter H.; and Boomer, John. Transformer assembly with exposed hollow housings, and multiple coils. 5,161,088, Cl. 361-383.000.

Burkarth, Nadine; Marty, Christian; and Rappart, Yvan, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.". Method of making shell moulds for casting. 5,159,970, Cl. 164-517.000.

Burke, David, to BSRD Limited. Seat belt buckle. 5,159,732, Cl. 24-641.000.

Burke, Francis M.; and Buchanan, William L., to Dale Electronics, Inc. Thermistor. 5,160,912, Cl. 338-22.00R.

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Bussard, Robert W., to QED, Inc. Method and apparatus for creating and controlling nuclear fusion reactions. 5,160,695, Cl. 376-107.000.

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Butler Manufacturing Company: *See—*
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Byrd, Clayton R. Reflector assembly for removable depending securement to each stirrup to protect a rider and horse. 5,159,802, Cl. 54-46.100.

Byrnes, Stephen L.; and Cosper, Robert G., Jr., to Dresser-Rand Company. Method and apparatus for machining the inside surface of a closed hollow casing. 5,159,862, Cl. 82-1.110.

C. A. Wieidmuller GmbH & Co.: *See—*
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Cadillac Rubber & Plastics, Inc.: *See*—
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Cagan, Uri; Diamant, Lev; and Goodman, Geoffrey, to Amrad Research and Development. Electronic level indicator. 5,159,761, Cl. 33-366.000.

Cairns, John P., to Computer Security Corp. System for encryption and identification. 5,161,190, Cl. 380-23.000.

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Stapleton, Jeff T., 5,161,246, Cl. 395-111.000.
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Caldwell Manufacturing Company: *See*—
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Calfee, Craig D. Method of manufacturing a composite bicycle frame. 5,160,682, Cl. 264-161.000.

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Cameron, Bruce A.: *See*—
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Cammarata, Robert M.: *See*—
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Camp International, Inc.: *See*—
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Campbell, Ian D.: *See*—
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Candler, Edrick L., Jr.: *See*—
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Candor, James T. Apparatus and method for removing liquid from liquid bearing material. 5,160,593, Cl. 204-180.100.

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Ebinuma, Ryuichi; Ozawa, Kunitaka; Kariya, Takao; Uzawa, Shunichi; and Nose, Noriyuki, 5,161,176, Cl. 378-34.000.
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Iwashita, Tomonori; Egawa, Akira; and Sugiyama, Yoshiaki, 5,160,952, Cl. 354-76.000.
Iwashita, Tomonori; and Tsujimoto, Sinichi, 5,160,953, Cl. 354-173.100.
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Marumo, Mitsuji; Iwamoto, Kazunori; Mizusawa, Nobutoshi; Kariya, Takao; and Uzawa, Shunichi, 5,160,961, Cl. 355-53.000.
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Carco, Timothy J.: *See*—
Gasser, William J.; Carco, Timothy J.; and Justin, Anthony J., 5,160,430, Cl. 210-138.000.

Cardis, Angeline B.; and Shanholtz, Carl E., to Mobil Oil Corporation. Olefin/maleic anhydride copolymer heterocyclic-azoles as antiwear additives, and fuel compositions. 5,160,349, Cl. 44-331.000.

Cardis, Angeline B.; Goyal, Arjun K.; Shanholtz, Carl E.; and Wiszniewski, Virginia C., to Mobil Oil Corporation. Multifunctional ashless detergent additives for fuels and lubricants. 5,160,649, Cl. 252-47.500.

Carey, Scott T.: *See*—
Wechsler, Monroe S.; and Carey, Scott T., 5,160,917, Cl. 340-686.000.

Carl Freudenberg, Firma: *See*—
Budde, Volker, 5,159,907, Cl. 123-90.550.

Carlen Controls, Inc.: *See*—
Carlen, Eric T., 5,160,886, Cl. 324-207.160.

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Jonsson, Jan A.; and Carlshaf, Alf, 5,160,625, Cl. 210-635.000.

Carlson, Richard W.: *See*—
Braun, John P.; Goodman, Sperry H.; and Carlson, Richard W., 5,160,936, Cl. 343-725.000.

Carlsson, Claes-Goran: *See*—
Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nabo, Olle, 5,160,311, Cl. 494-56.000.

Carman, Lee A.; Coblenz, William S.; and Hammarstrom, Janet L., to Norton Company. Self-bonded ceramic abrasive wheels. 5,160,509, Cl. 51-307.000.

Carney, William V., to Porta Systems Corp. Connector block assembly. 5,160,273, Cl. 439-108.000.

Carpenter, John F.; and Brockbank, Kelvin G. M., to Cryolife, Inc. Process for preparing tissue for transplantation. 5,160,313, Cl. 600-36.000.

Carr, Robert J. G.; Clarke, David J.; and Al-Shukri, Sumaia, to Public Health Laboratory Service Board. Optical determination of velocity using crossed interference fringe patterns. 5,160,976, Cl. 356-349.000.

Carron, Henry; and Jourdan-LaForte, Eric, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Aqueous liquid bleaching detergents which are stable during storage and washing process. 5,160,656, Cl. 252-99.000.

Carson, Paul L.; Fitting, Dale W.; Robinson, Andrew L.; and Terry, Fred L., Jr. Ultrasonic image sensing array and method. 5,160,870, Cl. 310-339.000.

Carter, Gordon: *See*—
Waltrip, Donald W.; and Carter, Gordon, 5,160,766, Cl. 427-384.000.

Carter, Jeffery A.; Otsubo, Peggy M.; Gravenstede, Kenneth N.; and Grotz, Robert A., to TRW Inc. Multifield identification circuit and related method of operation. 5,161,230, Cl. 395-800.000.

Carter, Steven H.; Lockyer, Terence D.; and Gahan, Christopher J., to 3COM Technologies, Ltd. Repeaters for secure local area networks. 5,161,192, Cl. 380-48.000.

Cartmell, James V.; and Sturtevant, Wayne R., to NDM Acquisition Corp. Hydrogel bandage. 5,160,328, Cl. 604-307.000.

Casio Computer Co., Ltd.: *See*—
Morikawa, Shigenori; Hanzawa, Kohtaro; Sasaki, Hiroyuki; and Morokuma, Hiroshi, 5,160,798, Cl. 84-615.000.
Tanoi, Minoru; and Kizaki, Masayasu, 5,161,009, Cl. 359-82.000.

Caspers, Johannes, to Deutsche Thomson-Brandt GmbH. Device for removing a disk-shaped recorded medium from the compartments of a magazine and for playing the medium. 5,161,138, Cl. 369-36.000.

Casseau, William U.: *See*—
Krug, John A.; Willis, William L.; Dumser, Paul J.; Casseau, William U.; Deet, William T.; Culligan, Laurence E.; and Walter, Bruce A., 5,159,882, Cl. 105-362.000.

Cassella Aktiengesellschaft: *See*—
Buhler, Ulrich; Kuhn, Reinhard; and Boos, Margareta, 5,160,495, Cl. 534-854.000.

Cassou, Bertrand: *See*—
Cassou, Robert; Cassou, Maurice; and Cassou, Bertrand, 5,160,940, Cl. 346-75.000.

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Cassou, Robert; Cassou, Maurice; and Cassou, Bertrand, 5,160,940, Cl. 346-75.000.

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Castagner, Bernard; Cord, Paul-Philippe; Doin, Bernard; and Kozyreff, Michel, to S.N.C. Livbag. Impact-absorbing device for occupants of a motor vehicle and use of this device. 5,160,163, Cl. 280-740.000.

Caterpillar Inc.: *See*—
Allen, William E.; Anderson, Paul D.; Bradbury, Walter J.; Hadank, John M.; and League, Richard B., 5,160,239, Cl. 414-699.000.
Hefler, Gregory W.; and Evancik, Michael J., 5,159,811, Cl. 60-322.000.

Catlin, Robert W., to Chips and Technologies, Inc. Memory controller for using reserved DRAM addresses for EMS. 5,161,218, Cl. 395-425.000.

Cauwet, Daniele: *See*—
Dubief, Claude; and Cauwet, Daniele, 5,160,730, Cl. 424-59.000.

Caveney, L. Patrick: *See*—
Moore, Charles A.; Kowansky, Ann; Flood, Robert W.; and Caveney, L. Patrick, 5,160,300, Cl. 474-257.000.

Cawlfield, David W.; Dotson, Ronald L.; Duncan, Budd L.; Mendiratta, Sudhir K.; and Woodard, Kenneth E., Jr., to Olin Corporation. Process for the production of perchloric acid. 5,160,416, Cl. 204-82.000.

Caywood, John: *See*—
Owen, William H.; Caywood, John; Drori, Joseph; Jaffe, James; Nojima, Isao; Sung, Jeffrey; and Wang, Ping, 5,161,157, Cl. 371-10.200.

Cegielski, Michael J.; and van den Berg, Teunis T. Method and apparatus for selectively mixing gases. 5,159,924, Cl. 128-203.120.

Cenky, Mark A.: *See*—
Hohider, David; and Cenky, Mark A., 5,161,091, Cl. 361-386.000.

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Pele, Daniele; and Choquet, Bruno, 5,161,001, Cl. 358-138.000.

Centre Stephanois de Recherches Mecaniques Hydromecanique et Frottement: *See*—
Terrat, Jean-Paul; and Fort, Pascal, 5,160,537, Cl. 106-36.000.

Centritech AB: *See*—
Yhland, Carl, 5,160,310, Cl. 494-45.000.

CESA - Compagnie Europeenne de Sieges pour Automobiles: *See*—
Bloch, Gerard; and Loeb, Jean, 5,159,726, Cl. 5-453.000.

Chaconas, Peter G.: *See*—
Rising, Peter E.; and Chaconas, Peter G., 5,159,799, Cl. 53-433.000.

Chakravarty, Abhijit J.; and Nakamura, Yoshiki, to Boeing Company, The. Failure analysis system. 5,161,158, Cl. 371-15.100.

Chance, Christopher N.: *See*—
Adams, John M.; Chance, Christopher N.; DeBlasio, James A.; Evers, Donald H.; Harris, William C., Jr.; Kirby, Michael A., Sr.; Newsome, Reginald W.; Pham, Xuan M.; and Talley, Robert E., 5,160,023, Cl. 206-256.000.

Chang, Cheng-Tsung. Esthetic bracket protector. 5,160,260, Cl. 433-8.000.

Chang, Chien I. Multi-function chair. 5,160,182, Cl. 297-129.000.

Chang, David B., to Hughes Aircraft Company. Desalinization system. 5,160,634, Cl. 210-748.000.

Chang, Hugh: *See*—
Watkins, John; Van Loo, William C.; Michels, Kurt; and Chang, Hugh, 5,161,162, Cl. 371-29.500.

Chang, Keh-Minn, to General Electric Company. Method for improving low temperature ductility of directionally solidified iron-aluminides. 5,160,557, Cl. 148-546.000.

Chang, Kwei T. Electric heat-convection stove with transparent housing. 5,160,829, Cl. 219-400.000.

Chang, Yen C.; and Werner, Jeffrey A., to LSI Logic Corporation. Weighted-delay column adder and method of organizing same. 5,161,119, Cl. 364-786.000.

Chaplain, Eugenie M.: *See*—
Meche, Paul S.; Hanley, Donald V.; and Chaplain, Eugenie M., 5,161,249, Cl. 455-33.300.

Chapman, John R.; and Jones, David S., to Kratos Analytical Limited. Ion source for a mass spectrometer. 5,160,841, Cl. 250-288.000.

Chapman, John U.: *See*—
Ashley, Paul; and Chapman, John U., 5,159,967, Cl. 160-265.000.

Char, Aka L.: *See*—
Sibley, Barry; and Char, Aka L., 5,160,021, Cl. 206-204.000.

Charles Industries, Ltd.: *See*—
Charles, Joseph T.; and Reinhart, Michael A., 5,160,852, Cl. 307-77.000.

Charles, Joseph T.; and Reinhart, Michael A., to Charles Industries, Ltd. Power adapter. 5,160,852, Cl. 307-77.000.

Chasan, David E.: *See*—
Odorisio, Paul A.; Chasan, David E.; and Pastor, Stephen D., 5,160,647, Cl. 252-47.000.

Chaudhuri, Ratan K.; Narayanan, Kolazi S.; and Dahanayake, Manilal, to ISP Investments Inc. Delivery system for agricultural chemicals. 5,160,528, Cl. 71-79.000.

Chauvin, Jacques: *See*—
Rodriguez-Cavazos, Enrique; Gleim, Gunter; and Chauvin, Jacques, 5,161,002, Cl. 358-140.000.

Chavous, Robert O. Call interceptor for emergency systems. 5,161,180, Cl. 379-45.000.

Chaya, Masahiko; and Imokawa, Naoki, to Canon Kabushiki Kaisha. Disc cleaning device. 5,161,146, Cl. 369-72.000.

Chazalon, Michel; Gauthereau, Didier; Micolon, Patrice; and Palanque, Serge, to Commissariat a l'Energie Atomique. Process for the production of an image intensifier module for optical fibre illuminated signs. 5,160,565, Cl. 156-242.000.

Chemical Grouting Company: *See*—
Yoshida, Hiroshi; Shibazaki, Mitsuhiro; Kubo, Hiroaki; and Jinbo, Shunji, 5,160,220, Cl. 405-236.000.

Chemical Waste Management, Inc.: *See*—
Gilles, Greg; and Husain, Matt, 5,160,636, Cl. 210-763.000.

Chen, Chao C.; Zwaskis, William; and Ortiz, Mark, to Ethicon, Inc. Endoscopic suture clip. 5,160,339, Cl. 606-158.000.

Chen, Chenson K., to Massachusetts Institute of Technology. Edge-heat sink technqiue for zone melting recrystallization of semiconductor-on-insulator films. 5,160,575, Cl. 156-620.700.

Chen, Chi Y. Coupling for securing a handlebar to a bicycle frame. 5,160,210, Cl. 403-24.000.

Chen, Chin-Long: *See*—
Bossen, Douglas C.; Chen, Chin-Long; and Hsiao, Mu-Yue, 5,161,163, Cl. 371-54.000.

Chen, Kim H.: *See*—
Crawford, Robert K.; Leibovitz, Jacques; Miller, Daniel J.; and Chen, Kim H., 5,161,090, Cl. 361-385.000.

Chen, Li; and Maa, Pyn, to Xonix Electronic Watch Enterprise Co., Ltd. Tide watch. 5,161,129, Cl. 368-19.000.

Chen, Mike: *See*—
Jurga, Stanley M.; and Chen, Mike, 5,159,715, Cl. 2-2.000.

Cheng, David, to Applied Materials, Inc. Multi-channel plasma discharge endpoint detection method. 5,160,402, Cl. 156-627.000.

Chern, T. P. Structure of a self-drilling threaded insert for use on drywall. 5,160,225, Cl. 411-30.000.

Cherry, James R.; Stevens, David P.; and Raynus, Abel, to Armatron International, Inc. System and method for detecting the presence of objects in the path of movable vehicle. 5,160,927, Cl. 340-904.000.

Chesebrough-Pond's U.S.A. Co., Division of Conopco Inc.: *See*—
Macaulay, Ernest W.; and Williams, Richard M., 5,160,738, Cl. 424-401.000.

Chesebrough-Pond's USA Co., Division of Conopco, Inc.: *See*—
Kanga, Vispi, 5,160,739, Cl. 424-401.000.

Cheselske, David A., to R & D Molded Products, Inc. Wedge-base LED bulb housing. 5,160,200, Cl. 362-249.000.

Cheverie, Paul H.: *See*—
Galano, Kenneth P.; and Cheverie, Paul H., 5,161,169, Cl. 375-8.000.

Chevron Research Company: *See*—
Pecoraro, Theresa A., 5,160,601, Cl. 208-120.000.

Chevron Research and Technology Company: *See*—
Graebner, Peter, 5,159,833, Cl. 73-155.000.
Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, 5,160,650, Cl. 252-49.600.
Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, 5,160,651, Cl. 252-49.600.
Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, 5,160,652, Cl. 252-49.600.

Chiba, Yuji, to Canon Kabushiki Kaisha. Substrate holding apparatus for holding a substrate in an exposure apparatus. 5,161,177, Cl. 378-34.000.

Chicago Lock Company: *See*—
Mlynarczyk, Mitch, 5,160,180, Cl. 292-252.000.

Chikama, Toshio, to Machida Endoscope Co., Ltd. Endoscope cover. 5,159,919, Cl. 128-4.000.

Childers, Charles P., to Marathon Oil Company. Automatic pollution containment and alert apparatus for liquid drainages. 5,160,036, Cl. 210-85.000.

Chips and Technologies, Inc.: *See*—
Catlin, Robert W., 5,161,218, Cl. 395-425.000.

Chisso Corporation: *See*—
Takahashi, Ryoji, 5,160,582, Cl. 162-117.000.

Chlop, Bernard W., to Systems Development Group. Two dimensional sound diffusor. 5,160,816, Cl. 181-285.000.

Cho, Shizuo, to OKI Electric Industry Co., Ltd. Random access memory including word line clamping circuits. 5,161,121, Cl. 365-189.060.

Choi, Hoon-Sun, to Samsung Electronics Co., Ltd. Multi-screen generation circuit. 5,161,012, Cl. 358-183.000.

Cholewczynski, Ken: *See*—
Moore, Kevin D.; Stafford, John W.; Beckenbaugh, William M.; and Cholewczynski, Ken, 5,160,409, Cl. 156-656.000.

Chonan, Mitsugi, to Fuji Jukogyo Kabushiki Kaisha. Structure for mounting a water pump on an engine. 5,159,901, Cl. 123-41.470.

Choquet, Bruno: *See*—
Pele, Daniele; and Choquet, Bruno, 5,161,001, Cl. 358-138.000.

Chou, Schiao F.: *See*—
Cox, Walter G., Jr.; and Chou, Schiao F., 5,160,690, Cl. 264-328.100.

Christie, Nancy J.; and Schotter, Daniel K., to Hughes Aircraft Company. Optical fiber canister and process with overcoat adhesive layer to prevent dispensing end breaks. 5,161,208, Cl. 385-128.000.

Chu, Pochen; Klocke, Donald J.; Marler, David O.; McWilliams, John P.; and Vartuli, James C., to Mobil Oil Corporation. Zeolite synthesis using an alcohol or like molecules. 5,160,500, Cl. 585-486.000.

Chu, Richard C.; Ellsworth, Michael J., Jr.; Goth, Gary F.; Simons, Robert E.; and Zumbrunnen, Michael L., to International Business Machines Corporation. Enhanced multichip module cooling with thermally optimized pistons and closely coupled convective cooling channels, and methods of manufacturing the same. 5,161,089, Cl. 361-385.000.

Chuang, Ching-Pao; and Lin, Jung-Tai. Collapsible tent frame. 5,159,947, Cl. 135-102.000.

Chuang, Tung-Hsien. Electronic plug. 5,160,280, Cl. 439-675.000.

Church & Dwight Co., Inc.: *See*—
Kirschner, Lawrence; Lajoie, Michael S.; and Spears, William E., Jr., 5,160,547, Cl. 134-7.000.

Ciais, Jean-Pierre; and Hermant, Eric, to Societe Europeenne de Propulsion. Highly adaptable combined propulsion engine for an aircraft or a space-going airplane. 5,159,809, Cl. 60-225.000.

Ciba-Geigy Corporation: *See*—
Fuso, Francesco; and Reinert, Gerhard, 5,160,346, Cl. 8-442.000.
Odorisio, Paul A.; Chasan, David E.; and Pastor, Stephen D., 5,160,647, Cl. 252-47.000.

Ciokajlo, John J., to General Electric Company. Lightweight engine turbine bearing support assembly for withstanding radial and axial loads. 5,160,251, Cl. 415-142.000.

Citta, Richard W.; and Dicke, Stephen M., to Zenith Electronics Corporation. System for peaking a video signal with a control signal representative of the perceptual nature of blocks of video pixels. 5,161,015, Cl. 358-162.000.

CKD Corporation: *See*—
Takagi, Fumio, 5,160,179, Cl. 285-340.000.

Clairol Inc.: *See*—
Berthiaume, Marianne; and Jachowicz, Janusz, 5,160,733, Cl. 424-71.000.

Clark, David E.; and Wistrom, Kenneth W., to University of Florida. Fabrication of homogenous sol-gel derived multiphase materials using gelling control agents. 5,160,455, Cl. 252-315.700.

Clark Door Limited: *See*—
Ashley, Paul; and Chapman, John U., 5,159,967, Cl. 160-265.000.

Clark, Peter P.; and Londono, Carmina, to Polaroid Corporation. Radiation source for a printer. 5,161,064, Cl. 359-663.000.

Clarke, David J.: *See*—
Carr, Robert J. G.; Clarke, David J.; and Al-Shukri, Sumaia, 5,160,976, Cl. 356-349.000.

Clarke, Jonathan P., to General Electric Company. Fan case liner for a gas turbine engine with improved foreign body impact resistance. 5,160,248, Cl. 415-9.000.
Claxton, Gerald L., to Up-Right International Manufacturing, Ltd. Automatic hydraulic leveling system. 5,159,989, Cl. 180-41.000.
Clay, Dale L.; Allington, Robert W.; Jameson, Daniel G.; and Winter, Robin R., to Isco, Inc. Apparatus and method for supercritical fluid extraction. 5,160,624, Cl. 210-634.000.
Clemens, John M.: *See*—
Brown, William E., III; Safford, Sarah E.; and Clemens, John M., 5,160,701, Cl. 422-56.000.
Cleveland State University: *See*—
Talu, Orhan, 5,160,512, Cl. 55-28.000.
Cleven, Russell: *See*—
Johnston, Daniel J.; and Cleven, Russell, 5,160,189, Cl. 312-201.000.
Clipps, Inc.: *See*—
Radvin, Bill, 5,159,730, Cl. 24-543.000.
Clough, John M.: *See*—
Anthony, Vivienne; Clough, John M.; deFraine, Paul; Godfrey, Christopher; and Beautement, Kevin, 5,160,364, Cl. 71-92.000.
Clouse, James A.; and Melody, Brian J., to Aerovox M, Inc. Electrolytic capacitor and electrolyte therefor. 5,160,653, Cl. 252-62.200.
Clubley, Brian G.; and Rideout, Jan, to FMC Corporation. Scale inhibition. 5,160,630, Cl. 210-699.000.
CMS Gilbreth Packaging Systems, Inc.: *See*—
Dickey, Daniel M., 5,160,570, Cl. 156-448.000.
Coalier, Guy: *See*—
Bacques, Jean-Yves; and Coalier, Guy, 5,160,307, Cl. 493-176.000.
Coates, Douglas L. Ski sling. 5,160,074, Cl. 224-257.000.
Coblenz, William S.: *See*—
Carman, Lee A.; Coblenz, William S.; and Hammarstrom, Janet L., 5,160,509, Cl. 51-307.000.
Coca-Cola Company, The: *See*—
Hong, Ing-Tsann; and Fitch, Ernest C., 5,160,633, Cl. 210-739.000.
Cochran, Danny B.: *See*—
Mortillo, Anthony J.; Cochran, Danny B.; and Micale, Anthony J., Jr., 5,159,896, Cl. 119-50.500.
Cochran, Joseph W., to Progress Materials Inc. Method and product of fly ash benefication by carbon burnout in a dry bubbling fluid bed. 5,160,539, Cl. 106-405.000.
Cocito, Giuseppe; and Greco, Giorgio, to CSELT - Centro Studi E Laboratori Telecomunicazioni S.p.A. System for measuring the refractive index profile of optical components. 5,160,973, Cl. 356-73.100.
Codex Corporation: *See*—
Galano, Kenneth P.; and Cheverie, Paul H., 5,161,169, Cl. 375-8.000.
Cogema: *See*—
Verdier, Michel; and Mortgat, Regis, 5,160,697, Cl. 376-352.000.
Cohen, Barry. Newspaper cart for stacking, tying and unloading of newspapers. 5,159,875, Cl. 100-34.000.
Cohen, Cornelius B., Jr.: *See*—
Roy, Maria J.; and Cohen, Cornelius B., Jr., 5,159,965, Cl. 160-38.000.
Cohen, Joel A.; and Virnelson, R. Craig, to Tremco Incorporated. FT-IR spectrometer window and method. 5,160,826, Cl. 250-339.000.
Coker, Thomas A.: *See*—
McClure, David C.; and Coker, Thomas A., 5,161,159, Cl. 371-22.100.
Colapicchioni, Claudio; Porcelli, Filippo; and Nuzzolo, Carlo A., to Eniricerche S.p.A. Sensor with antigen chemically bonded to a semiconductor device. 5,160,597, Cl. 204-403.000.
Colbert, Henry J.: *See*—
Doone, Rodney M.; and Colbert, Henry J., 5,159,748, Cl. 29-613.000.
Colburn, Perry. Bio-tube aquatic filter. 5,160,039, Cl. 210-150.000.
Cole, Ronald D., to Automation International, Inc. Apparatas and method for lifting and transporting palletized workpieces. 5,160,079, Cl. 228-212.000.
Colen, William J. Wall construction and spacer for use therewith. 5,159,795, Cl. 52-564.000.
Collette, Wayne N.; Miller, Bryan H.; Krishnakumar, Suppayan M.; and Nahill, Thomas E., to Continental PET Technologies, Inc. Reinforced container base and method of forming same. 5,160,059, Cl. 215-1.00C.
Colpo, James A.: *See*—
Lambing, Cynthia L. T.; Colpo, James A.; and Herbein, William C., 5,160,771, Cl. 428-57.000.
Colton, Jonathan S.; and Suh, Nam P., to Massachusetts Institute of Technology. Microcellular foams of semi-crystaline polymeric materials. 5,160,674, Cl. 264-50.000.
Colton, Raymond H.: *See*—
Newbold, David D.; and Colton, Raymond H., 5,160,514, Cl. 55-158.000.
Columbus, Richard L.: *See*—
Palmer, Harvey J.; and Columbus, Richard L., 5,159,842, Cl. 73-864.010.
Comau SPA: *See*—
Alborante, Giancarlo, 5,159,844, Cl. 73-865.900.
Commissariat a l'Energie Atomique: *See*—
Chazalon, Michel; Gauthereau, Didier; Micolon, Patrice; and Palanque, Serge, 5,160,565, Cl. 156-242.000.
Commonwealth Scientific & Industrial Research: *See*—
Dabbs, Timothy P., 5,161,053, Cl. 359-384.000.
Compaq Computer Corporation: *See*—
Griffin, Michael R.; George, Daryl D.; and Jones, Curtis R., Jr., 5,161,102, Cl. 395-800.000.
Composite Materials Technology, Inc.: *See*—
Wong, James; and Rudziak, Mark K., 5,160,550, Cl. 148-96.000.
Wong, James; Rudziak, Mark K.; and Capone, Donald W., II., 5,160,794, Cl. 428-661.000.
Computer Security Corp.: *See*—
Cairns, John P., 5,161,190, Cl. 380-23.000.
Concentric Industries: *See*—
Mendon, Stephen P., 5,160,156, Cl. 280-250.100.
Condon, Dennis E.; Bley, Robert S.; and Pukait, Bobby, to Mentor Corporation. Scope and stent system. 5,159,920, Cl. 128-6.000.
Conoco Inc.: *See*—
Allison, Joe D., 5,160,413, Cl. 203-35.000.
Becraft, Lloyd G.; and Nanni, Edward J., 5,160,602, Cl. 208-131.000.
Constantini, Michel; and Popa, Jean-Michel, to Rhone-Poulenc Chimie. Hydroxylation of phenols/phenol ethers. 5,160,496, Cl. 568-771.000.
Continental PET Technologies, Inc.: *See*—
Collette, Wayne N.; Miller, Bryan H.; Krishnakumar, Suppayan M.; and Nahill, Thomas E., 5,160,059, Cl. 215-1.00C.
Continuous Hose Corporation: *See*—
Hockett, Wayne B., 5,160,688, Cl. 264-275.000.
Conway, Lori J.: *See*—
Katsoulis, Dimitris E.; Conway, Lori J.; and Schulz, William J., Jr., 5,160,732, Cl. 424-68.000.
Cook, B. Tod: *See*—
Billings, R. Gail; Wallace, William D.; Cutler, Christopher A.; and Cook, B. Tod, 5,160,334, Cl. 606-34.000.
Cook Incorporated: *See*—
Anderson, Burton A., 5,159,861, Cl. 81-487.000.
Cooke, Theodore M.; and Reed, Wilfred F., to Trident, Inc. Rapidly drying impulse ink jet ink compositions. 5,160,535, Cl. 106-19.00R.
Cooper Industries, Inc.: *See*—
Fitzgerald, James J.; and Owen, Marvin L., 5,160,277, Cl. 439-554.000.
Hynes, Joseph H., 5,159,982, Cl. 166-345.000.
Corbett, Scott S., III: *See*—
Fox, Roy W., Jr.; Corbett, Scott S., III; Miller, David F.; and Daane, Laurence A., 5,160,269, Cl. 439-67.000.
Corbin, Michael: *See*—
Metzer, Nancy; and Corbin, Michael, 5,160,217, Cl. 405-128.000.
Cord, Paul-Philippe: *See*—
Castagner, Bernard; Cord, Paul-Philippe; Doin, Bernard; and Kozyreff, Michel, 5,160,163, Cl. 280-740.000.
Cormier, Michel J. N.; Ledger, Philip W.; and Amkraut, Alfred, to ALZA Corporation. Reduction or prevention of skin irritation by drugs. 5,160,741, Cl. 424-450.000.
Corp, Douglas M.; Hyde, Robert W.; Brooks, Frank W., Sr.; Holliday, Gary G.; and Fanelli, Michael W., to General Motors Corporation. Unispring drum brake assembly. 5,159,998, Cl. 188-340.000.
Corring, Robert, to Lever Brothers Company, Division of Conopco, Inc. Gel detergent compositions containing a clay and a cross-linked polycarboxylic polymer. 5,160,448, Cl. 252-95.000.
Cory, Evelyn: *See*—
Owens, Dolores; and Cory, Evelyn, 5,159,735, Cl. 15-104.940.
Cosman, Eric R. Curved-shaped floor stand for use with a linear accelerator in radiosurgery. 5,160,337, Cl. 606-130.000.
Cosmos Systems, Inc.: *See*—
McConnell, David P., 5,160,035, Cl. 209-439.000.
Cosper, Robert G., Jr.: *See*—
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Fabbri, William C.; and Crane, Roy, 5,160,193, Cl. 362-33.000.
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Nikoloff, Koyu P., 5,160,484, Cl. 427-439.000.
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Carpenter, John F.; and Brockbank, Kelvin G. M., 5,160,313, Cl. 600-36.000.
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Norton, William W., 5,160,608, Cl. 210-134.000.
Culligan, Laurence E.: *See*—
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Williams, John C.; Westerson, Kevin W.; Muntean, George L.; and Sullivan, Thomas W., 5,159,911, Cl. 123-467.000.
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Seydel, Matthew H.; and Seydel, Katherine G., 5,160,154, Cl. 280-47.190.
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Matsuo, Makoto; Utsumi, Minoru; Ogusu, Chihaya; Mukasa, Shunsuke; Kudo, Yoshiaki; Obata, Hiroyuki; Aono, Takashi; Mohri, Hiroshi; Koike, Masato; Amano, Hideaki; and Saito, Norikazu, 5,161,233, Cl. 355-218.000.
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Kuch, Ingo; and Kretschmer, Jurgen, 5,160,562, Cl. 156-189.000.
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Kitakado, Ryuji; Yano, Hironobu; and Hoki, Tetsuo, 5,161,202, Cl. 382-8.000.
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Yamada, Kohei, 5,160,775, Cl. 428-95.000.
Daiwa Seiko, Inc.: *See*—
Oishi, Harumichi, 5,160,128, Cl. 271-114.000.
Dale Electronics, Inc.: *See*—
Burke, Francis M.; and Buchanan, William L., 5,160,912, Cl. 338-22.00R.
Dallas Semiconductor Corporation: *See*—
Hui, Titkwan, 5,160,863, Cl. 307-605.000.
Daly, Paul D., to Siemens Automotive L.P. Intake manifold/fuel rail method. 5,160,691, Cl. 264-334.000.
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Killinger, Erich, 5,160,921, Cl. 340-783.000.
Dammann, Wilbur A. Method and means of generating gas from water for use as a fuel. 5,159,900, Cl. 123-3.000.
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Johansson, Ingemar; and Svedman, Kjell, 5,160,540, Cl. 106-672.000.
Danieli, Sten H. Velocity-controlled railway buffer. 5,160,123, Cl. 267-226.000.
Dant Corporation: *See*—
Merrick, Bruce C., 5,159,788, Cl. 52-8.000.
Dart Engineering AG: *See*—
Ekman, Thure, 5,159,955, Cl. 137-614.030.
Dasher, Preston B.: *See*—
Price, Elvin C.; and Dasher, Preston B., 5,159,889, Cl. 112-269.100.
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David, Mark P. Electronic audio memory with single action single control. 5,161,199, Cl. 381-51.000.
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Deet, William T.: *See*—
Krug, John A.; Willis, William L.; Dumser, Paul J.; Casseau, William U.; Deet, William T.; Culligan, Laurence E.; and Walter, Bruce A., 5,159,882, Cl. 105-362.000.
deFraine, Paul: *See*—
Anthony, Vivienne; Clough, John M.; deFraine, Paul; Godfrey, Christopher; and Beautement, Kevin, 5,160,364, Cl. 71-92.000.
DeGeorge, Joseph R.: *See*—
Neri, Michael A., 5,160,467, Cl. 264-101.000.
Degremont: *See*—
Savall, Vincent; and Ball, Francois-Xavier, 5,160,705, Cl. 422-140.000.
Deguchi, Hiromi: *See*—
Takagi, Toshiaki; and Deguchi, Hiromi, 5,160,615, Cl. 210-321.800.
Deichmann, Ronald S.: *See*—
Kuykendal, Robert L.; Usher, David R.; and Deichmann, Ronald S., 5,160,086, Cl. 239-18.000.
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Sissala, Mikko; and de Jong, Johannes, 5,159,995, Cl. 187-88.000.
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Delaney, William F.: *See*—
Everett, Patrick N.; Delaney, William F.; and Griswold, Marsden P., 5,160,959, Cl. 355-53.000.
de Leeuw, Petrus J. L. Steel post shore, or prop, for supporting of formwork in constructing buildings. 5,160,109, Cl. 248-354.400.
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Glossop, Donald L., Jr.; Delena, Giuseppe; and Fobar, William J., 5,159,781, Cl. 49-375.000.
DeLuca, Patrick P.; and Rypacek, Frantisek, to University of Kentucky Research Foundation, The. Biodegradable microspheres as a carrier for macromolecules. 5,160,745, Cl. 424-487.000.
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Varner, James E., Sr.; and DePriest, June W., 5,159,784, Cl. 51-173.000.
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DeRosa, John; Hagstrom, Lauren M.; Hilde, Lon S.; and Wiesler, Oren, to Digital Equipment Corporation. System and method for dynamic avoidance of a simultaneous switching output limitation of an integrated circuit chip. 5,160,922, Cl. 340-825.500.

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Ianna, Joseph T.; and Deshong, John C., 5,161,250, Cl. 455-66.000.

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De Simone, Mitch D.; and Heieren, Bruce G. Gray water recovery system with ozone treatment. 5,160,606, Cl. 210-110.000.

Desmond, Dennis P.: *See*—
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Metzner, Wolfgang; Pallaske, Michael; and Wegen, Hans-Werner, 5,159,778, Cl. 43-121.000.

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Deugo, L. Scott; Mansfield, Andrew; Salzman, Michael; von Huene, Bernhard; and von Huene, Eberhard, to Krueger International Inc. Wall system. 5,159,793, Cl. 52-126.100.

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von Benda, Klaus; and Benczur-Urmossy, Gabor, 5,160,659, Cl. 252-182.100.

Deutsche Thomson-Brandt GmbH: *See*—
Caspers, Johannes, 5,161,138, Cl. 369-36.000.

Develco, Inc.: *See*—
Dailey, Patrick E.; Barron, Charles D.; and Rorden, Louis H., 5,160,925, Cl. 340-853.300.

De Vries, Johan W. C.: *See*—
Brand, Hans-Wolfgang; Klee, Mareike K.; De Vries, Johan W. C.; Waser, Rainer M.; and Wolters, Robertus A. M., 5,160,762, Cl. 427-79.000.

Dexide, Inc.: *See*—
Brancel, Dale H.; Freitas, Michael W.; and Zierhut, Clarence D., 5,160,343, Cl. 606-205.000.

Dhein, Rolf: *See*—
Hildenbrand, Karlheinz; Hugl, Herbert; and Dhein, Rolf, 5,160,436, Cl. 210-638.000.

Dia Semicon Systems Incorporated: *See*—
Ikeda, Osamu, 5,161,097, Cl. 363-124.000.

Dialogic Corporation: *See*—
Zwick, Nicholas, 5,161,181, Cl. 379-67.000.

Diamant, Lev: *See*—
Cagan, Uri; Diamant, Lev; and Goodman, Geoffrey, 5,159,761, Cl. 33-366.000.

Diamonex Incorporated: *See*—
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Dias, Daniel M.; Iyer, Balakrishna R.; and Yu, Philip S., to International Business Machines Corporation. Multilevel locking system and method. 5,161,227, Cl. 395-650.000.

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Martignoni, Fabrizio; Diazzi, Claudio; Pidutti, Albino; and Vio, Fabio, 5,160,854, Cl. 307-264.000.

Dicke, Stephen M.: *See*—
Citta, Richard W.; and Dicke, Stephen M., 5,161,015, Cl. 358-162.000.

Dickey, Daniel M., to CMS Gilbreth Packaging Systems, Inc. Ultra high speed labeling apparatus. 5,160,570, Cl. 156-448.000.

Didier-Werke AG: *See*—
Rothfuss, Hans; Metzger, Herbert; Winkelman, Manfred; Winkler, Hans G.; and Kopia, Jochen, 5,160,478, Cl. 266-200.000.

Diethelm, Alois, to Geberit AG. Drive for a shower arm or a bidet device. 5,159,722, Cl. 4-420.400.

Digital Equipment Corporation: *See*—
DeRosa, John; Hagstrom, Lauren M.; Hilde, Lon S.; and Wiesler, Oren, 5,160,922, Cl. 340-825.500.
Dobberpuhl, Daniel W., 5,160,855, Cl. 307-270.000.
Lampson, Butler W.; Hawe, William R.; Gupta, Amar; and Spinney, Barry A., 5,161,193, Cl. 380-49.000.
Lee, Neville K. S., 5,161,134, Cl. 369-13.000.

Digital Telecommunications Systems, Inc.: *See*—
Smith, Benjamin A.; and Burnett, Steven W., 5,161,184, Cl. 379-413.000.

Diorio, Mark L.: *See*—
Dutta, Vivek B.; Demmin, Jeffrey C.; Diorio, Mark L.; and Ewanich, Jon T., 5,159,750, Cl. 29-827.000.

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Dischler, Helmut. Overload clutch with automatic disengagement. 5,160,006, Cl. 192-56.00R.

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Wrobel, Avi, 5,160,201, Cl. 362-249.000.

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Bricker, James C.; Ebbeler, Robert E.; and Roseman, Michael R., 5,160,709, Cl. 422-263.000.

Divgi, Chaitanya R.: *See*—
Welt, Sydney; Divgi, Chaitanya R.; Yeh, Samual; Old, Lloyd J.; Oettgen, Herbert F.; Real, Francisco X.; and Sakamoto, Junichi, 5,160,723, Cl. 424-1.100.

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Dobrez, John G.; and Reeks, Michael A., 5,160,439, Cl. 210-709.000.

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Doi, Akihiko: *See*—
Takeuchi, Ryoji; Yoshimaru, Tomohisa; and Doi, Akihiko, 5,161,144, Cl. 369-54.000.

Doi, Junichi: *See*—
Yoshimura, Hiroshi; Kitada, Masahito; Takeuchi, Koichiro; and Doi, Junichi, 5,159,856, Cl. 74-867.000.

Doin, Bernard: *See*—
Castagner, Bernard; Cord, Paul-Philippe; Doin, Bernard; and Kozyreff, Michel, 5,160,163, Cl. 280-740.000.

Doki, Masahiko; and Ooiwa, Kiyoshi, to Fujitsu Limited and Fuji Electric Co., Ltd. Plasma process apparatus and plasma processing method. 5,160,397, Cl. 156-345.000.

Dolev, Danny; and Dwork, Cynthia, to International Business Machines Corporation. System for secure and private communication in a triple-connected network. 5,161,186, Cl. 380-2.000.

Domer, Steven M.: *See*—
Malek-Khosravi, Behnam; McCullough, Matthew L.; and Domer, Steven M., 5,161,161, Cl. 371-28.000.

Donelan, Michael E.; and Hern, Joel C., to Heidelberg Harris, Inc. System for moving a plate cylinder relative to a blanket cylinder. 5,159,878, Cl. 101-217.000.

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Bae, Jong-Chan, 5,160,948, Cl. 352-1.000.

Donker, Cornelis B.; Hull, Michael; and van de Pas, Johannes C., to Lever Brothers Company, Division of Conopco, Inc. Aqueous structured liquid detergent compositions containing selected peroxygen bleach compounds. 5,160,655, Cl. 252-95.000.

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Dorchak, Wayne A., to Atlantic Richfield Company. Hierarchical process control system and method. 5,161,110, Cl. 364-468.000.

Dotson, Ronald L.: *See*—
Cawlfield, David W.; Dotson, Ronald L.; Duncan, Budd L.; Mendiratta, Sudhir K.; and Woodard, Kenneth E., Jr., 5,160,416, Cl. 204-82.000.

Dow Chemical Company, The: *See*—
Khazai, Bijan; and Moore, William G., 5,160,698, Cl. 419-12.000.
Pyzik, Aleksander J.; Rossow, Harold E.; Schwarz, Douglas B.; Beaman, Donald R.; Pyzik, Barbara M.; and Dubensky, William J., 5,160,508, Cl. 51-307.000.
Shmidt, Creston D.; and Stobby, William G., 5,160,784, Cl. 428-316.600.

Dow Corning Corporation: *See*—
Graville, Steven W.; and Reese, Clifford C., 5,160,470, Cl. 264-123.000.
Halloran, Daniel J., 5,160,449, Cl. 252-174.150.
Halm, Roland L.; and Zapp, Regie H., 5,160,720, Cl. 423-342.000.
Katsoulis, Dimitris E.; Conway, Lori J.; and Schulz, William J., Jr., 5,160,732, Cl. 424-68.000.
Krzysik, Duane G.; and LeGrow, Gary E., 5,160,494, Cl. 512-3.000.

Dow Corning Toray Silicone Co., Ltd.: *See*—
Hamada, Mitsuo; Sakuma, Atsushi; and Shimizu, Koji, 5,160,670, Cl. 264-6.000.

Dow Corning Toray Silicone Co., Ltd: *See*—
Shimizu, Koji, 5,160,681, Cl. 264-128.000.

Dow, Warren A., to Harcros Pigments, Inc. Container filling machine, particularly for concentrated liquid pigment. 5,159,962, Cl. 141-98.000.

Doyle, John T.: *See*—
Swaffield, John D.; and Doyle, John T., 5,160,282, Cl. 439-721.000.

Drake, Donald J., to Xerox Corporation. Pagewidth thermal ink jet printhead. 5,160,945, Cl. 346-140.00R.

Drake, Donald J.: *See*—
Fisher, Almon P.; and Drake, Donald J., 5,160,403, Cl. 156-633.000.

Drake, James S. Programmed learning device. 5,160,267, Cl. 434-349.000.

Drayer, Lonnie R.: *See*—
Mazer, Terrence B.; Meyer, Glenn A.; Hwang, Shie-Ming; Candler, Edrick L., Jr.; Drayer, Lonnie R.; and Daab-Krzykowski, Andre, 5,160,742, Cl. 424-469.000.

Dresser Industries, Inc.: *See*—
Prescott, Robert C.; Simpson, Donald C.; Sanford, Philip H.; and Nudd, Howard W., 5,159,949, Cl. 137-84.000.

Dresser-Rand Company: *See*—
Byrnes, Stephen L.; and Cosper, Robert G., Jr., 5,159,862, Cl. 82-1.110.
Drew, Terrence M.; Hanson, Chris A.; and Hanson, Alden B., to Alden Laboratories, Inc. Hand padding device. 5,159,717, Cl. 2-20.000.
Drori, Joseph: *See*—
Owen, William H.; Caywood, John; Drori, Joseph; Jaffe, James; Nojima, Isao; Sung, Jeffrey; and Wang, Ping, 5,161,157, Cl. 371-10.200.
Drumm, Arthur E. Strip brush for mounting on a rotary drum. 5,160,187, Cl. 300-21.000.
Druyvesteyn, Willem F.; Hoogendoorn, Abraham; Van De Kerkhof, Leon M.; and Veldhuis, Raymond N. J., to U.S. Philips Corporation. Coder for incorporating an auxiliary information signal in a digital audio signal, decoder for recovering such signals from the combined signal, and record carrier having such combined signal recorded thereon. 5,161,210, Cl. 395-2.000.
Du Pont Canada Inc.: *See*—
Ascough, Michael R., 5,160,354, Cl. 55-37.000.
Dubensky, William J.: *See*—
Pyzik, Aleksander J.; Rossow, Harold E.; Schwarz, Douglas B.; Beaman, Donald R.; Pyzik, Barbara M.; and Dubensky, William J., 5,160,508, Cl. 51-307.000.
Dubief, Claude; and Cauwet, Daniele, to L'Oreal. Use of an aqueous dispersion based on organopolysiloxanes and on a crosslinked ammonium acrylate/acrylamide compolymer in cosmetics, for the treatment of hair or the skin and/or in dermatology. 5,160,730, Cl. 424-59.000.
DuBois, Gerald N., III, to Townsend Engineering Company. Safety means for powered machinery. 5,160,289, Cl. 452-127.000.
Dufournet, Denis; and Perret, Michel, to GEC Alsthom SA. Series-arc high tension circuit-breaker. 5,160,818, Cl. 200-148.00A.
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Archer, Robert; and Duggin, Harold O., 5,159,917, Cl. 126-25.00R.
Dullea, Leonard V.: *See*—
Dutta, Arunava; and Dullea, Leonard V., 5,160,663, Cl. 252-301.40R.
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Fourrey, Francois; and Verhoog, Roel, 5,160,167, Cl. 280-806.000.
Hoblingre, Andre , 5,160,165, Cl. 280-775.000.
Eckert, Charles E.; and Walker, Nicholas G. Impeller for treating molten metals. 5,160,693, Cl. 266-235.000.
Edgren, David E.; and Theeuwes, Felix, to Alza Corporation. Annealed composition for pharmaceutically acceptable drug. 5,160,743, Cl. 424-473.000.
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Moscovitch, Jerry, 5,160,075, Cl. 224-328.000.
Edler, James P., to Eaton Corporation. Process for nitriding silicon containing materials. 5,160,719, Cl. 423-344.000.
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Edwards, Thomas C. Rotary vane machines with anti-friction positive bi-axial vane motion controls. 5,160,252, Cl. 418-1.000.
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Eisele, Ronald, to Fibronix Sensoren GmbH. Device for optoelectronic interface measurement and refractometry in liquids. 5,159,834, Cl. 73-293.000.
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Schenck, John F.; Souza, Steven P.; and Eisner, David R., 5,159,930, Cl. 128-653.500.
Ekman, Thure, to Dart Engineering AG. Coupling part comprising pressure-reducing means. 5,159,955, Cl. 137-614.030.
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Keren, Hanan, 5,160,891, Cl. 324-318.000.
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Elton, Richard K., to C. R. Bard, Inc. Lubricious hydrogel coatings. 5,160,790, Cl. 428-412.000.
Emanuel, Peter M., to RCA Thomson Licensing Corporation. "Channel guide" automatically activated by the absence of program information. 5,161,019, Cl. 358-183.000.
Emery, Jamie; and Montgomery, Horace, to Baxter International Inc. Dual-lumen oocyte aspiration needle. 5,160,319, Cl. 604-27.000.
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LeBlanc, Leo J., 5,160,064, Cl. 220-644.000.
ESAB Welding Products, Inc.: *See*—
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Pettigrew, Robert M.; Harry, Alan J.; Nailor, Paul R.; Adelmann, Fred; Franzen, Peter; and Schoon, Juergen, 5,160,943, Cl. 346-76.0PH.
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Smith, Kim R.; Borland, James E.; Crutcher, Terry; and Sauer, Joe D., 5,160,658, Cl. 252-174.190.
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Evancik, Michael J.: *See*—
Hefler, Gregory W.; and Evancik, Michael J., 5,159,811, Cl. 60-322.000.
Evans, John M.; and Thakrar, Ashok R., to Pilkington Visioncare, Inc. Method of manufacturing a contact lens. 5,160,463, Cl. 264-17.000.
Everett, Patrick N.; Delaney, William F.; and Griswold, Marsden P., to Massachusetts Institute of Technology. Device and method for the alignment of masks. 5,160,959, Cl. 355-53.000.
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Habeeb, Jacob J.; and Beltzer, Morton, 5,160,644, Cl. 252-32.70E.
Lahn, Gerard C.; Kaiser, Frederick J., Jr.; and Fiato, Rocco A., 5,160,456, Cl. 252-373.000.
Eyermann, Manfred; and Weigt, Josef, to Robert Bosch GmbH. Cranking device for internal combustion engines. 5,159,908, Cl. 123-179.100.
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Brown, Marvin A., 5,160,614, Cl. 210-275.000.
Fabbri, William C.; and Crane, Roy, to Keene Corporation. Modular medical light system. 5,160,193, Cl. 362-33.000.
Faber, Sol, to GTE Government Systems Corporation. Container for electronic equipment. 5,160,357, Cl. 55-385.200.
Faiks, Frederick S.; Anderson, Craig M.; and Bischoff, Daniel R., to Steelcase, Inc. Controller for seating and the like. 5,160,184, Cl. 297-304.000.
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Fairlie, Robert H.; and Stirland, Simon J., to British Aerospace Public Limited Company. Method of producing a dual reflector antenna system. 5,160,937, Cl. 343-781.00P.
Falkiner, Robert J.; Poirier, Marc A.; and Campbell, Ian D., to Exxon Research and Engineering Company. Process for removing elemental sulfur from fluids. 5,160,045, Cl. 210-634.000.
Falou, Mohamad S.; Finch, Timothy D.; Garner-Gray, Peter F.; Hight, Andrew T.; Murphy, Martin M.; Newbold, Geoffrey; Niven, Ian E.; and Savill, Derek G., to Lever Brothers Company, Division of Conopco, Inc. Laundry treatment product. 5,160,654, Cl. 252-91.000.
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Corp, Douglas M.; Hyde, Robert W.; Brooks, Frank W., Sr.; Holliday, Gary G.; and Fanelli, Michael W., 5,159,998, Cl. 188-340.000.
Fant, Karl M.: *See*—
Rylander, Karen S.; Fant, Karl M.; and Egli, Werner H., 5,161,013, Cl. 358-160.000.
Fargo, Foster M.; Geiselman, Ted S.; and Jones, Alan H., to IRIS Graphics, Inc. Method and means for calibrating an ink jet printer. 5,160,938, Cl. 346-1.100.
Farrell, Richard B.; and Orlowski, David P., to Automated Storage & Retrieval Systems of America Inc. Movable storage system with aisle monitoring apparatus. 5,160,190, Cl. 312-201.000.
Farrell, William M.: *See*—
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Faville, Paul E., to Boeing Company, The. Automated drill bit recognition system. 5,160,978, Cl. 356-394.000.
Favre, Robert, to Ferton Holding. Device for acting by ultrasonic vibrations on an object. 5,160,336, Cl. 606-128.000.
Feinberg, Stewart C., to Du Pont de Nemours, E. I., and Company. Laminates with adhesive layers of fire retardant, melt stable ethylene/carboxylic acid copolymer compositions. 5,160,788, Cl. 428-344.000.
Feldman, Melvin D. Toothbrush with externally illuminated bristles. 5,160,194, Cl. 362-109.000.
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Meller, Moshe; and Feldman, Michael, 5,160,263, Cl. 433-125.000.
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Hicks, Richard E.; and Fenner, Richard R., 5,160,517, Cl. 55-385.100.
Fenwick, David, to Apple Computer, Inc. Pattern recognition system having inter-pattern spacing correction. 5,161,245, Cl. 382-40.000.
Ferguson, John L. Apparatus and method for reducing motion sickness. 5,161,196, Cl. 381-1.000.
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Ferra, William E. Compact color-coded folding map. 5,160,170, Cl. 283-35.000.
Ferraro, John R.; Foerster, Philip P.; Greenstreet, Peter T.; Schwarz, Steven R.; and Turgeon, Milton R., to United Technologies, Corp. Buoy deployment system. 5,160,101, Cl. 244-118.100.
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Fiala, Paul E. Portable electric cutting and scoring saw. 5,159,870, Cl. 83-863.000.
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Hibler, Donald R.; and Hinrichs, James O., 5,160,070, Cl. 60-250.000.
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Fillon, Roger, 5,160,198, Cl. 366-198.000.
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Hampton, John R.; and Asher, Thomas L., 5,160,442, Cl. 210-791.000.
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Fischer, David; and Kohlert, Rudolf, to Romheld GmbH. Self centering chuck. 5,160,151, Cl. 279-121.000.

Fischer, Kurt F.; and Awotwi, Samuel A., to TRW Vehicle Safety Systems Inc. Gas deflection device for an air bag assembly. 5,160,164, Cl. 280-743.000.

Fisher, Almon P.; and Drake, Donald J., to Xerox Corporation. Precision diced aligning surfaces for devices such as ink jet printheads. 5,160,403, Cl. 156-633.000.

Fishman, Udi; and Park, Harry, to Aedi, Inc. Automatic dispensing feeder having a linear activator and a flexible skimmer. 5,160,068, Cl. 222-352.000.

Fitch, Ernest C.: *See*—
Hong, Ing-Tsann; and Fitch, Ernest C., 5,160,633, Cl. 210-739.000.

Fitjer, Holger, to Georg Karl Geka-Brush GmbH. Container for cosmetics, in particular mascara unit. 5,160,057, Cl. 215-1.00C.

Fitting, Dale W.: *See*—
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Fitzgerald, James J.; and Owen, Marvin L., to Cooper Industries, Inc. Snap-in lamp for printed circuits. 5,160,277, Cl. 439-554.000.

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Fleishman, Ron; and Fleishman, Lorraine, 5,159,966, Cl. 160-84.100.

Fleishman, Ron; and Fleishman, Lorraine. Fan-type blind for semicircular arched window. 5,159,966, Cl. 160-84.100.

Fleming, Robert L., Jr.; Hart, Walter F., Jr.; Lindall, Edward V., Jr.; Reid, Ronnie D.; and Stewrat, John A., III, to Du Pont de Nemours, E. I., and Company. Tenter-type stretcher having means for detecting clip obstructions. 5,159,733, Cl. 26-93.000.

Flexpaq Corporation: *See*—
Mennella, Louis P., 5,160,022, Cl. 206-232.000.

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Gunnerson, Fred S.; Sanderlin, F. Dave; Iurato, Joy R.; and Padilla, Antonio A., 5,159,972, Cl. 165-32.000.

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Goodman, John G.; and Fernley, Anthony, 5,160,017, Cl. 198-789.000.
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Fobar, William J.: *See*—
Glossop, Donald L., Jr.; Delena, Giuseppe; and Fobar, William J., 5,159,781, Cl. 49-375.000.

Foerster, Philip P.: *See*—
Ferraro, John R.; Foerster, Philip P.; Greenstreet, Peter T.; Schwarz, Steven R.; and Turgeon, Milton R., 5,160,101, Cl. 244-118.100.

Fogarty, Terence M., to Minnesota Mining and Manufacturing Company. Three piece mold assembly for making an ocular device. 5,160,749, Cl. 425-412.000.

Follmer, William C.; Greenberg, Jeffry A.; and Messih, Isis A., to Ford Motor Company. Dynamic fuel control. 5,159,914, Cl. 123-494.000.

Fontichiaro, Dominic; and Kabat, Daniel M., to Ford Motor Company. Adjustable valve system for an internal combustion engine. 5,159,906, Cl. 123-90.180.

Forbord, Kent J.; and Haidari, Mehdi S., to Seagate Technology, Inc. Flexible retainer for cantilevered matrix board. 5,161,074, Cl. 360-97.010.

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Follmer, William C.; Greenberg, Jeffry A.; and Messih, Isis A., 5,159,914, Cl. 123-494.000.
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Glossop, Donald L., Jr.; Delena, Giuseppe; and Fobar, William J., 5,159,781, Cl. 49-375.000.
Grutter, Peter J.; Stock, Gerald G.; Cushing, John A.; and Gopp, Alexander Y., 5,159,810, Cl. 60-274.000.

Ford, Ronald K., to Sutherland, Donald, Trustee of the Ralph L. Evans Trust. Ticket dispensing device and method. 5,160,076, Cl. 225-4.000.

Forester, Ralph H.; and Finkelstein, Arthur B., to Progeny Products, Inc. Absorbent insert. 5,160,331, Cl. 604-364.000.

Forestier, Alexandre, to Societe Nationale d'Etude et de Construction de Motors d'Aviation "S.N.E.C.M.A.". Control system for oxidizer intake diaphragms. 5,159,807, Cl. 60-39.230.

Fort, Pascal: *See*—
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Fortier, Joseph E. F.: *See*—
Bell, David H.; Fortier, Joseph E. F.; and Havens, Haven M., 5,160,637, Cl. 210-766.000.

Foster, Francis G., to Lever Brothers Company, Division of Conopco, Inc. Detergent composition with fabric softening properties. 5,160,641, Cl. 252-8.600.

Foster Wheeler Energy Corporation: *See*—
Murphy, John Q., 5,160,549, Cl. 148-201.000.

Foulard, Jean, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Temperature maintenance and metallurgical treatment furnace. 5,160,477, Cl. 266-99.000.

Fourrey, Francois; and Verhoog, Roel, to ECIA. Self-locking strap guide for a seat belt. 5,160,167, Cl. 280-806.000.

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Dodge, Richard N., II; Wagner, Ann L.; Fowler, Larry C.; Allen, Martin A.; and Fetcko, John T., III, 5,160,746, Cl. 425-7.000.

Fox, Richard J.; Lessure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., to Walt Disney Company, The. Amusement ride having pivotable ingress-egress bridges. 5,161,104, Cl. 364-410.000.

Fox, Roy W., Jr.; Corbett, Scott S., III; Miller, David F.; and Daane, Laurence A., to Precision Interconnect Corporation. Hydrostatic connector for flex circuits. 5,160,269, Cl. 439-67.000.

Frama AG: *See*—
Haug, Werner, 5,161,108, Cl. 364-464.020.

Framatome: *See*—
Verdier, Michel; and Mortgat, Regis, 5,160,697, Cl. 376-352.000.

Franke, Joschim; Kefer, Volker; and Wittchow, Eberhard, to Siemens Aktiengesellschaft. Continuous-flow steam generator. 5,159,897, Cl. 122-367.300.

Frankeny, Jerome A.; Frankeny, Richard F.; Hermann, Karl; and Wustrau, Rolf, to International Business Machines Corporation. Pivotal heat sink assembly. 5,161,087, Cl. 361-382.000.

Frankeny, Richard F.: *See*—
Frankeny, Jerome A.; Frankeny, Richard F.; Hermann, Karl; and Wustrau, Rolf, 5,161,087, Cl. 361-382.000.

Franks, George J., Jr. Adjustable telephone interface mounting clamp. 5,160,271, Cl. 439-92.000.

Franzen, Peter: *See*—
Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nabo, Olle, 5,160,311, Cl. 494-56.000.
Pettigrew, Robert M.; Harry, Alan J.; Nailor, Paul R.; Adelmann, Fred; Franzen, Peter; and Schoon, Juergen, 5,160,943, Cl. 346-76.0PH.

Fraunhofer-Gesellschaft zur Forderung Der Angewandten Forschung E.V.: *See*—
Waschkies, Eckhard; and Hepp, Klaus, 5,159,836, Cl. 73-587.000.

Frederickson, Arthur R.; Nanevicz, Joseph E.; Thayer, Jeffrey S.; and Parkinson, Dean B., to United States of America, Air Force. Process and apparatus for preventing the pulse discharge of insulators in ionizing radiation. 5,160,374, Cl. 106-401.000.

Fredriksson, Borje, to Beloit Technologies, Inc. High consistency sheet former. 5,160,584, Cl. 162-318.000.

Freitas, Michael W.: *See*—
Brancel, Dale H.; Freitas, Michael W.; and Zierhut, Clarence D., 5,160,343, Cl. 606-205.000.

Frequency Electronics, Inc.: *See*—
Stone, Charles S., 5,160,901, Cl. 331-37.000.

Fresenius, Jurgen: *See*—
Skocic, Ante; and Fresenius, Jurgen, 5,160,612, Cl. 210-230.000.

Friedman, Michael; and Sintov, Amnon, to Perio Products Ltd.; and Yissum Research Development Company. Liquid polymer composition, and method of use. 5,160,737, Cl. 424-401.000.

Friedrich, Christian; Reheis, Nikolaus; and Thalmann, Walter, to Schwarzkopf Technologies Corporation. Method of making high-strength brazed joints. 5,160,090, Cl. 228-121.000.

Friedrich Grohe Armaturenfabrik GmbH & Co.: *See*—
Klose, Odo, 5,160,197, Cl. 374-147.000.

Fringer, Daniel L. Debris shield for a hand held power saw. 5,159,759, Cl. 30-390.000.

Fromm, Paul M.; and Jaskowiak, Timothy R., to Xerox Corporation. Thin-tip stripper finger for use with a fuser roll in an electrophotographic apparatus. 5,160,130, Cl. 271-307.000.

Frost, Jack G.; and Snyder, Kenneth J., to Halliburton Company. Method for treating chelant solutions to remove metals in solution. 5,160,631, Cl. 210-720.000.

Fry, John J.; and Hall, George R., II, to Elsag International B.V. Method for RFI/EMI protection of electronic circuitry. 5,160,807, Cl. 174-35.00R.

Fry, Rupert J.; and Polgar, Gary E., to Molex Incorporated. Terminal positioning assurance device. 5,160,283, Cl. 439-752.000.

Fuhrman, Fred L.: *See*—
O'Hara, John; Fuhrman, Fred L.; Wolfe, David R.; and Irwin, Bruce C., 5,160,259, Cl. 432-37.000.

Fuji Electric Co., Ltd.: *See*—
Nakamura, Eiichi; Tanaka, Hiroaki; Tanaka, Yoshiharu; Iitake, Takashi; and Hoshikawa, Hiroshi, 5,160,604, Cl. 210-85.000.
Toraguchi, Makoto; Katagiri, Genichi; and Sakakibara, Yasushi, 5,160,152, Cl. 279-128.000.

Fuji Jukogyo Kabushiki Kaisha: *See*—
Chonan, Mitsugi, 5,159,901, Cl. 123-41.470.

Fuji Photo Film Co., Ltd.: *See*—
Hakkaku, Kunio; Tomoda, Susumu; Morita, Satosi; Masuda, Akira; and Odagiri, Sinji, 5,161,038, Cl. 358-496.000.
Hanada, Yoshikazu, 5,160,132, Cl. 271-265.000.
Hirashima, Takuya, 5,160,981, Cl. 356-446.000.
Ichikawa, Haruo; Iida, Sanpei; and Takahashi, Koichi, 5,159,747, Cl. 29-512.000.
Morita, Kiyoo, 5,160,028, Cl. 206-387.000.
Nakao, Souichiro, 5,161,025, Cl. 358-224.000.
Urabe, Yoshihiko; and Ohba, Toshio, 5,159,879, Cl. 101-465.000.

Fuji Xerox Co., Ltd.: *See*—
Miyake, Hiroyuki, 5,160,836, Cl. 250-208.100.
Fuji Xerox Corporation, Ltd.: *See*—
Saito, Hiroshi, 5,161,037, Cl. 358-468.000.
Shiina, Yoshio; Kato, Akihiko; Isosu, Toru; Kanno, Makoto; and Sato, Akihiko, 5,160,966, Cl. 355-206.000.
Fujihara, Noboru: *See*—
Harada, Takashi; Hatakeyama, Ken-ichi; Masuda, Norio; Fujihara, Noboru; and Inomata, Masayuki, 5,160,806, Cl. 174-35.0GC.
Fujii, Toshio: *See*—
Ishikawa, Hideaki; Sugiyama, Yoshihiro; Muto, Shunichi; and Fujii, Toshio, 5,160,993, Cl. 257-14.000.
Fujii, Yoshitaka: *See*—
Iyoda, Hiroumi; Saito, Chuichi; Shiina, Mamoru; and Fujii, Yoshitaka, 5,160,009, Cl. 198-337.000.
Fujikawa, Akinobu: *See*—
Ohshima, Mineo; and Fujikawa, Akinobu, 5,161,079, Cl. 360-132.000.
Fujikawa, Hisao: *See*—
Akiyama, Shunichiro; and Fujikawa, Hisao, 5,160,389, Cl. 148-327.000.
Fujimori, Naoji: *See*—
Nakahata, Hideaki; and Fujimori, Naoji, 5,160,869, Cl. 310-313.00A.
Fujimura, Susumu: *See*—
Harada, Takashi; Fujimura, Susumu; Higashiyama, Masahide; and Tokita, Hidetoshi, 5,160,038, Cl. 210-149.000.
Fujisawa, Masanori; and Kokubo, Kenichi, to Sanyo Electric Co., Ltd. Push-pull power amplifying circuit. 5,160,897, Cl. 330-274.000.
Fujita, Juichi: *See*—
Sato, Kyokuichi; and Fujita, Juichi, 5,159,953, Cl. 137-527.800.
Fujitsu Limited: *See*—
Akiyama, Shin, 5,161,114, Cl. 364-490.000.
Ishikawa, Hideaki; Sugiyama, Yoshihiro; Muto, Shunichi; and Fujii, Toshio, 5,160,993, Cl. 257-14.000.
Itoh, Junichi; and Kurita, Kazuyuki, 5,160,998, Cl. 257-760.000.
Motoyama, Takushi, 5,160,404, Cl. 156-643.000.
Fujitsu Limited and Fuji Electric Co., Ltd.: *See*—
Doki, Masahiko; and Ooiwa, Kiyoshi, 5,160,397, Cl. 156-345.000.
Fujitsu VLSI Limited: *See*—
Akiyama, Shin, 5,161,114, Cl. 364-490.000.
Fujiwara, Kenichi: *See*—
Ohishi, Shigeji; Honda, Shin; Sakakibara, Hisayoshi; and Fujiwara, Kenichi, 5,159,820, Cl. 62-468.000.
Fujiwara, Noboru: *See*—
Taniguchi, Naohiro; Koike, Syuzo; Watanabe, Yasuhiko; Takeuchi, Tadao; and Fujiwara, Noboru, 5,160,041, Cl. 210-205.000.
Fujiwara, Shigeki; and Maruyama, Ryosuke, to Matsushita Electric Works, Ltd. Multiple degree-of-freedom positioning device. 5,160,877, Cl. 318-568.210.
Fujiwara, Yoshihisa; and Genno, Hirokazu, to Sanyo Electric Co., Ltd. Method for driving thermal print head to maintain more constant print density. 5,160,941, Cl. 346-76.0PH.
Fukai, Hideaki: *See*—
Suenaga, Hiroyoshi; Ito, Takeshi; Takagi, Masakuni; Takeuchi, Hiroyoshi; Fukai, Hideaki; and Minakawa, Kuninori, 5,159,787, Cl. 51-326.000.
Fukano, Akira: *See*—
Takahashi, Hideki; Tani, Shigemitsu; Fukano, Akira; Katakura, Kazuto; Makimoto, Hitoshi; and Watanabe, Yoshikazu, 5,160,964, Cl. 355-200.000.
Fukazawa, Keiichi: *See*—
Fukumoto, Hiroshi; Namura, Koji; Nakamura, Hisashi; Fukazawa, Keiichi; and Naruki, Kenichi, 5,160,944, Cl. 346-76.0PH.
Fukuchi, Masakazu: *See*—
Haneda, Satoshi; Morita, Shizuo; Fukuchi, Masakazu; and Matsuo, Shunji, 5,160,963, Cl. 355-200.000.
Fukuda, Katsumi: *See*—
Ono, Takashi; Yagyu, Tatsuya; Fukuda, Katsumi; and Terasaki, Minako, 5,160,504, Cl. 8-436.000.
Fukuda, Masao: *See*—
Nishimura, Shigefumi; Fukuda, Masao; and Shimizu, Yoshiji, 5,160,422, Cl. 205-254.000.
Fukuda, Masayo: *See*—
Wada, Satoshi; Wakabayashi, Shinichi; and Fukuda, Masayo, 5,160,995, Cl. 257-207.000.
Fukuda, Norisuke; and Murakami, Koji, to Kabushiki Kaisha Toshiba. Washing machine. 5,159,823, Cl. 68-12.210.
Fukuhara, Satoru: *See*—
Todokoro, Hideo; Shinada, Hiroyuki; and Fukuhara, Satoru, 5,160,884, Cl. 324-158.00R.
Fukumochi, Yoji: *See*—
Kugimiya, Shuzo; Fukumochi, Yoji; Sata, Ichiko; Hirai, Tokyuki; and Suzuki, Hitoshi, 5,161,105, Cl. 364-419.000.
Fukumoto, Hiroshi; Namura, Koji; Nakamura, Hisashi; Fukazawa, Keiichi; and Naruki, Kenichi, to Mitsubishi Denki Kabushiki Kaisha. Thermal printer with anti-slip sheet conveying mechanism. 5,160,944, Cl. 346-76.0PH.
Fukushima, Koichi: *See*—
Yoshimatsu, Hideaki; and Fukushima, Koichi, 5,159,813, Cl. 60-459.000.
Fukushima, Masanobu: *See*—
Yasui, Takashi; Fukushima, Masanobu; and Hara, Kazuhiko, 5,161,228, Cl. 395-725.000.
Fukushima, Yoshihisa; Satoh, Isao; Takagi, Yuji; Azumatani, Yasushi; and Hamasaka, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Information recording-reproducing apparatus for optimizing data transfer. 5,161,143, Cl. 369-53.000.
Fulchiron, Noel; Naillon, Bernard; and Nadaud, Patrick, to Thomson-Brandt Armements. Munition for the distribution of an incendiary mixture. 5,160,803, Cl. 102-363.000.
Fumigation Maritime Ltee: *See*—
Gervais, Jocelyn, 5,160,381, Cl. 148-269.000.
Funayama, Masanori; and Kikuchi, Shuichi, to Sony Corporation. Reduced friction disc cartridge shutter sirfaces. 5,161,080, Cl. 360-133.000.
Funk, Hans W., to Proxitronic Funk GmbH & Co. KG. Optoelectronic image sensor for color cameras. 5,161,008, Cl. 358-44.000.
Furomoto, Yoshiyuki, to Shimano Industrial Co., Ltd. Fishing reel with shaft alignment construction. 5,160,099, Cl. 242-321.000.
Furukado, Tatsuhiko: *See*—
Ono, Hirofumi; and Furukado, Tatsuhiko, 5,159,951, Cl. 137-486.000.
Furuta, Hideya: *See*—
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.
Furuto, Toshiaki: *See*—
Iwamoto, Tetsushi; Yoshida, Yasunobu; Furuto, Toshiaki; and Sudo, Koichi, 5,160,675, Cl. 264-56.000.
Furuya, Junichi, to Japan Electronic Control Systems Co., Ltd. Method and system for controlling fuel supply for internal combustion engine coupled with supercharger. 5,159,913, Cl. 123-493.000.
Furuya, Masato: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Koyama, Yoshihisa; and Uchiyama, Yuji, 5,161,007, Cl. 358-43.000.
Fuselage Engineering Services Ltd.: *See*—
Luria, David, 5,159,994, Cl. 186-40.000.
Fuso, Francesco; and Reinert, Gerhard, to Ciba-Geigy Corporation. Photochemical and thermal stabilization of polyamide fibre materials with tetra-methyl-piperidinyl substituted triazine. 5,160,346, Cl. 8-442.000.
Futami, Takashi; Iwamoto, Tatsuhiko; and Okamura, Seijiro, to Nippon Zeon Co., Ltd. Composite molded articles. 5,160,772, Cl. 428-71.000.
G. M. Pfaff Atkiengesellschaft: *See*—
Arnold, Kurt; and Liell, Peter, 5,159,890, Cl. 112-278.000.
Gaal, Tamas: *See*—
Lukacsovich, Tamas; Venetianer, Pal; Gaal, Tamas; Boros, Imre; and Baliko, Gabriella, 5,160,489, Cl. 435-172.300.
Gaddipati, Achuta R.: *See*—
Singh, Raj N.; and Gaddipati, Achuta R., 5,160,676, Cl. 264-60.000.
Gahan, Christopher J.: *See*—
Carter, Steven H.; Lockyer, Terence D.; and Gahan, Christopher J., 5,161,192, Cl. 380-48.000.
Gaku, Morio; Ishii, Kenzi; and Nakai, Takamasa, to Mitsubishi Gas Chemical Company, Inc. Electrical laminate having ability to absorb ultraviolet rays. 5,160,787, Cl. 428-333.000.
Galano, Kenneth P.; and Cheverie, Paul H., to Codex Corporation. DCD with reprogramming instructions contained in removable cartridge. 5,161,169, Cl. 375-8.000.
Gale, Edwin J., to Stanley Aviation Corporation. Metal seal ball joint coupling assembly. 5,160,176, Cl. 285-165.000.
Gale, Rebecca J.: *See*—
Mahant-Shetti, Shivaling S.; Aton, Thomas J.; and Gale, Rebecca J., 5,159,752, Cl. 29-846.000.
Gallerneault, Christine E.: *See*—
Ball, Melville D.; Gallerneault, Christine E.; Hewitt, Bryan C.; and Lorenson, Claude P., 5,160,819, Cl. 219-10.55A.
Galvanetto, Francois: *See*—
Spiess, Hansruedi; and Galvanetto, Francois, 5,160,213, Cl. 404-25.000.
Gami, Bipin V.; and Jacobs, Russell H., to Micropolis Corporation. Low power disk drive spindle motor controller. 5,161,073, Cl. 360-73.030.
Gammache, Richard J. Flashlight with swivel head and rotary switch. 5,161,095, Cl. 362-197.000.
Ganesan, Madurai G.; Desai, Narendra R.; Maier, Gary A.; and Kulkarni, Prakash S., to American Cyanamid Company. Sustained release delivery system for substituted dihydropyridine calcium channel blockers. 5,160,734, Cl. 424-78.380.
Gansen, Michael J. Framing hammer construction. 5,159,858, Cl. 81-23.000.
Garcia, Felix, Jr., to Texas Instruments Incorporated. Projected volume display system and method. 5,161,054, Cl. 359-462.000.
Gardener, James H. Petri dish stack transfer system. 5,160,558, Cl. 156-60.000.
Gardiner, William C.: *See*—
Bell, Ronald D.; Gardiner, William C.; Howell, John R.; Matthews, Ronald D.; and Nichols, Steven P., 5,160,254, Cl. 431-7.000.
Garg, Diwakar; Tsai, Wilman; Iampietro, Robert L.; Kimock, Fred M.; and Kelly, C. Michael, to Diamonex Incorporated. Hot filament chemical vapor deposition reactor. 5,160,544, Cl. 118-724.000.
Gariepy, James A., to ABB Vetco Gray Inc. Threaded latch ring tubular connector. 5,160,172, Cl. 285-18.000.
Garner-Gray, Peter F.: *See*—
Falou, Mohamad S.; Finch, Timothy D.; Garner-Gray, Peter F.; Hight, Andrew T.; Murphy, Martin M.; Newbold, Geoffrey; Niven, Ian E.; and Savill, Derek G., 5,160,654, Cl. 252-91.000.

Garofalo, Robert, Jr. Apparatus for locking waste containers. 5,160,060, Cl. 220-318.000.

Garrett, Michael E., to BOC Group plc, The. Thermal insulation: CO_2 filled foam. 5,160,769, Cl. 428-36.500.

Garschagen, Friedrich A.; and Heym, Hans-Udo, to Wera-Werk Hermann Werner GmbH & Co. Machine for the machining of metal. 5,159,741, Cl. 29-27.00R.

Gartland, Robert J.; and Thomson, William H., to Goodyear Tire & Rubber Company, The. Tire having identification label affixed thereto. 5,160,383, Cl. 152-510.000.

Gary, James A.; and Merrill, Samuel, Jr. Autopsy apparatus. 5,160,340, Cl. 606-176.000.

Gas Services, Inc.: *See*—
Whipple, Richard B., 5,161,100, Cl. 364-160.000.

Gasser, William J.; Carco, Timothy J.; and Justin, Anthony J., to Brite-O-Matic Manufacturing, Inc. Car wash system using reverse osmosis concentrate for initial rinsing and permeate for final rinsing. 5,160,430, Cl. 210-138.000.

Gattuso, Peter. Oil containment boom and skimmer. 5,160,432, Cl. 210-242.300.

Gauthereau, Didier: *See*—
Chazalon, Michel; Gauthereau, Didier; Micolon, Patrice; and Palanque, Serge, 5,160,565, Cl. 156-242.000.

Gauuan Construction Co., Inc.: *See*—
Gauuan, Jim, 5,160,748, Cl. 425-458.000.

Gauuan, Jim, to Gauuan Construction Co., Inc. Dual concrete edging tool. 5,160,748, Cl. 425-458.000.

Geberit AG.: *See*—
Diethelm, Alois, 5,159,722, Cl. 4-420.400.

Gebr. Happich GmbH: *See*—
Viertel, Lothar; and Welter, Patrick, 5,160,203, Cl. 362-141.000.

GEC Alsthom SA: *See*—
Dufournet, Denis; and Perret, Michel, 5,160,818, Cl. 200-148.00A.

Geiselman, Ted S.: *See*—
Fargo, Foster M.; Geiselman, Ted S.; and Jones, Alan H., 5,160,938, Cl. 346-1.100.

Gelman Sciences Inc.: *See*—
Pemawansa, Kariyawasam P. W.; Heisler, Mark D.; and Kraus, Menahem, 5,160,626, Cl. 210-638.000.

Gembicki, Stanley A.: *See*—
Holmgren, Jennifer S.; Gembicki, Stanley A.; Schoonover, Michael W.; and Kocal, Joseph A., 5,160,032, Cl. 208-46.000.

Gen-Tech, Inc.: *See*—
Seitz, Robert F., 5,160,223, Cl. 410-9.000.

General DataComm, Inc.: *See*—
Reymond, Welles K., 5,160,270, Cl. 439-70.000.

General Electric Company: *See*—
Aleshin, Stephen, 5,160,822, Cl. 219-121.640.
Benz, Mark G.; and Sawyer, Thomas F., 5,160,532, Cl. 75-10.240.
Chang, Keh-Minn, 5,160,557, Cl. 148-546.000.
Ciokajlo, John J., 5,160,251, Cl. 415-142.000.
Clarke, Jonathan P., 5,160,248, Cl. 415-9.000.
Glynn, Christopher C., 5,160,241, Cl. 415-175.000.
Gorczyca, Thomas B.; Weaver, Stanton E., Jr.; and Wojnarowski, Robert J., 5,161,093, Cl. 361-414.000.
Herzner, Fredrick C.; Juenger, Jerome A.; and Wayte, Peter, 5,160,243, Cl. 416-220.00R.
Hines, William R.; and Farrell, William M., 5,160,080, Cl. 60-39.040.
Kast, Howard B., 5,159,808, Cl. 60-39.091.
Schenck, John F.; Souza, Steven P.; and Eisner, David R., 5,159,930, Cl. 128-653.500.
Singh, Raj N.; and Gaddipati, Achuta R., 5,160,676, Cl. 264-60.000.

General Motors Corporation: *See*—
Corp, Douglas M.; Hyde, Robert W.; Brooks, Frank W., Sr.; Holliday, Gary G.; and Fanelli, Michael W., 5,159,998, Cl. 188-340.000.

General Signal Corporation: *See*—
Shafer, David; and Powell, Ian, 5,161,062, Cl. 359-785.000.

Genno, Hirokazu: *See*—
Fujiwara, Yoshihisa; and Genno, Hirokazu, 5,160,941, Cl. 346-76.0PH.

Genou, Patrick, to Eferel S.A. Process and device for supplying processing gas to a reactor located in a zone subjected to intense electric and/or electromagnetic fields. 5,160,825, Cl. 219-121.430.

Genske, Roger P.; and Bauer, Frank, to American National Can Company. Peelable packaging and sheet materials and compositions for use therein. 5,160,767, Cl. 428-35.980.

Gentry, Scott B.; Mazur, Joseph F.; and Blackburn, Brian K. Electrified fishing lure. 5,159,773, Cl. 43-17.100.

Gentry, Thomas L.: *See*—
Arzonico, Barbara W.; Norman, Alan B.; and Gentry, Thomas L., 5,159,944, Cl. 131-365.000.

Georg Karl Geka-Brush GmbH: *See*—
Fitjer, Holger, 5,160,057, Cl. 215-1.00C.

George, Daryl D.: *See*—
Griffin, Michael R.; George, Daryl D.; and Jones, Curtis R., Jr., 5,161,102, Cl. 395-800.000.

Georgia Tech Research Corporation: *See*—
Logan, Kathryn V., 5,160,716, Cl. 423-297.000.

Gerace, Janet M.: *See*—
Gerace, Michael J.; and Gerace, Janet M., 5,160,628, Cl. 210-667.000.

Gerace, Michael J.; and Gerace, Janet M., to Aster, Inc. Method of making a filler from automotive paint sludge, filler, and sealant containing a filler. 5,160,628, Cl. 210-667.000.

Gerard, Jean-Michel; and Marzin, Jean-Yves, to Minister of Post, Telecommunications and Space. Device for the conversion of an infrared radiation into another radiation of energy greater than that of this infrared radiation. 5,160,992, Cl. 359-326.000.

Gerber, Matthias: *See*—
Mayer, Horst; Hamprecht, Gerhard; Westphalen, Karl-Otto; Walter, Helmut; and Gerber, Matthias, 5,160,365, Cl. 71-93.000.

Gerbier, Patrick: *See*—
Rigat-Esselin, J. Pierre; Gerbier, Patrick; and Menvielle, Marc, 5,160,928, Cl. 341-20.000.

Geringer, Kerry, to Sauer, Inc. Displacement control feedback apparatus and method. 5,160,245, Cl. 417-218.000.

Gervais, Jocelyn, to Fumigation Maritime Ltee. Method for forming artificially and rapidly patina on copper, products thereof and solutions therefor. 5,160,381, Cl. 148-269.000.

Gestion des brevets Fraco limitee: *See*—
St-Germain, Andre , 5,159,993, Cl. 182-82.000.

Gewerkschaft Eisenhutte Westfalia GmbH: *See*—
Dettmers, Michael; and Peters, Bernd, 5,159,872, Cl. 91-432.000.

Geysen, Mario: *See*—
Tuunanen, Jukka; Narvanen, Ale; and Geysen, Mario, 5,160,378, Cl. 134-25.100.

Ghosh, Tirthankar; and Mattox, John R., to Rohm and Haas Company. Alkene stabilizers for 3-isothiazolone compounds. 5,160,526, Cl. 71-67.000.

Gianelli, Gian C., to W. R. Grace & Co.-Conn. Bag opening device. 5,159,800, Cl. 53-492.000.

Gibson, Peter O. Trilateral track bicycle pedal. 5,159,853, Cl. 74-594.600.

Giese, Robert W.: *See*—
Thaler, Martin D.; Giese, Robert W.; Puletti, Paul; and Schmidt, Robert, 5,160,686, Cl. 264-255.000.

Giglia, Salvatore: *See*—
Bikson, Benjamin; and Giglia, Salvatore, 5,160,042, Cl. 210-321.800.

Gilb, Tyrell T., to Simpson Strong-Tie Company, Inc. Post to railing tie. 5,160,211, Cl. 403-231.000.

Gilbert, Paul H.; Niemann, Ronald G.; and Trapp, Robert L., to Johns Hopkins University, The. Discrete automatic gain control with high stability, high speed and low distortion. 5,161,170, Cl. 375-98.000.

Gillard, Paul H.: *See*—
Lucca, Eusebio; and Gillard, Paul H., 5,160,406, Cl. 156-62.400.

Gillberg-LaForce, Gunilla E.: *See*—
Cussler, Edward L.; Gillberg-LaForce, Gunilla E.; Sansone, Michael J.; and Schisla, David K., 5,160,627, Cl. 210-639.000.

Gilles, Greg; and Husain, Matt, to Chemical Waste Management, Inc. Process for the treatment of mixed wastes. 5,160,636, Cl. 210-763.000.

Gionfriddo, Michelangelo. Procedure for the reduction of the cross-section of a wire. 5,160,589, Cl. 204-129.100.

Giordano, James R.: *See*—
Willis, James L.; and Giordano, James R., 5,160,094, Cl. 62-137.000.

Girke, Dieter: *See*—
Wahner, Gero; and Girke, Dieter, 5,160,804, Cl. 102-443.000.

GKN Automotive, Inc.: *See*—
Schneider, Dean J., 5,160,298, Cl. 464-111.000.
Uchman, Frederick J., 5,160,297, Cl. 464-111.000.

Glaenzer Spicer: *See*—
Orain, Michel, 5,160,108, Cl. 72-370.000.

Gleim, Gunter: *See*—
Rodriguez-Cavazos, Enrique; Gleim, Gunter; and Chauvin, Jacques, 5,161,002, Cl. 358-140.000.

Glossop, Donald L., Jr.; Delena, Giuseppe; and Fobar, William J., to Ford Motor Company. Window panel position regulating assembly. 5,159,781, Cl. 49-375.000.

Glynn, Christopher C., to General Electric Company. Multi-port air channeling assembly. 5,160,241, Cl. 415-175.000.

Gobbels, Heinz-Dieter: *See*—
Schippers, Norbert; Raasch, Hans; Gobbels, Heinz-Dieter; and Preutenborbeck, Maximilian, 5,159,804, Cl. 57-261.000.

Gochanour, Craig R., to Du Pont de Nemours, E. I., and Company. Gas separation membrane with ultrathin layer. 5,160,353, Cl. 55-158.000.

Godfrey, Christopher: *See*—
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Goetz, Helmut; Scheibinger, Ludwig; and Steinbach, Peter, to Metz Mannheim GmbH. Ventilation system for a liquid-filled basin. 5,160,460, Cl. 261-122.100.

Goldberg, Harris A.; and Reifenberger, Ronald G., to Hoechst Celanese Corp. High speed information system utilizing scanning tunneling microscopy in conjunction with a modulated light source. 5,161,147, Cl. 369-100.000.

Goldberger, Daniel S.: *See*—
Yelderman, Mark; Goldberger, Daniel S.; and Braig, James R., 5,159,936, Cl. 128-736.000.

Goldstar, Co., Ltd.: *See*—
Kim, Jae Hyun, 5,160,797, Cl. 84-613.000.

Gomi, Hiroshi; Kumagai, Tomoharu; Hirose, Masato; and Nishikawa, Masao, to Honda Giken Kogyo Kabushiki Kaisha. Articulated structure for legged walking robot. 5,159,988, Cl. 180-8.600.

Gonzalez, Oziel. Fishing cart apparatus. 5,159,777, Cl. 43-54.100.

Gonzalez, Rita M.: *See*—
Montemayor, Ezequiel d.; Ollervides, Marina T.; and Gonzalez, Rita M., 5,160,377, Cl. 118-13.000.

Goodman, Geoffrey: *See*—
Cagan, Uri; Diamant, Lev; and Goodman, Geoffrey, 5,159,761, Cl. 33-366.000.

Goodman, John G.; and Fernley, Anthony, to FMC Corporation. Rolling ball assembly and deck. 5,160,017, Cl. 198-789.000.
Goodman, Sperry H.: *See*—
Braun, John P.; Goodman, Sperry H.; and Carlson, Richard W., 5,160,936, Cl. 343-725.000.
Goodwin, Norman W.: *See*—
Welkowsky, Murray S.; Vasudev, P. K.; Reif, Philip G.; and Goodwin, Norman W., 5,160,560, Cl. 156-154.000.
Goodyear Tire & Rubber Company, The: *See*—
Gartland, Robert J.; and Thomson, William H., 5,160,383, Cl. 152-510.000.
Gopp, Alexander Y.: *See*—
Grutter, Peter J.; Stock, Gerald G.; Cushing, John A.; and Gopp, Alexander Y., 5,159,810, Cl. 60-274.000.
Gorberg, Boris L.: *See*—
Spitsin, Valentin M.; Karetnikov, Evgeny V.; Grishin, Sergei F.; Ivanov, Andrei A.; and Gorberg, Boris L., 5,160,592, Cl. 204-164.000.
Gorczyca, Thomas B.; Weaver, Stanton E., Jr.; and Wojnarowski, Robert J., to General Electric Company. Multiple lamination high density interconnect process and structure employing a variable crosslinking adhesive. 5,161,093, Cl. 361-414.000.
Goronkin, Herbert; Zhu, X. Theodore; and Maracas, George N., to Motorola, Inc. Phonon suppression in quantum wells. 5,160,982, Cl. 257-23.000.
Gorza, Roberto; Baggio, Giorgio; and Battistella, Mirco, to Nordica S.p.A. Safety fastening, particularly for skis. 5,160,159, Cl. 280-632.000.
Goth, Gary F.: *See*—
Chu, Richard C.; Ellsworth, Michael J., Jr.; Goth, Gary F.; Simons, Robert E.; and Zumbrunnen, Michael L., 5,161,089, Cl. 361-385.000.
Goto, Akihito; and Enoki, Yasutaka, to Bridgestone Corporation. Heavy duty pneumatic tires. 5,160,385, Cl. 152-209.00R.
Goyal, Arjun K.: *See*—
Cardis, Angeline B.; Goyal, Arjun K.; Shanholtz, Carl E.; and Wiazniewski, Virginia C., 5,160,649, Cl. 252-47.500.
Graber Industries, Inc.: *See*—
Kutchmarek, Darrell J.; and Stauffacher, James H., 5,160,563, Cl. 156-204.000.
Graebner, Peter, to Chevron Research and Technology Company. Analyzing a hydrocarbon reservoir by determining the response of that reservoir to tidal forces. 5,159,833, Cl. 73-155.000.
Graham, Thomas S.; and McAliley, Todd R. Rotating disc support rack. 5,160,053, Cl. 211-164.000.
Grasso, Giorgio; and Righetti, Aldo, to Pirelli Cavi S.p.A. Optical amplifier with bent, single-mode active fiber. 5,161,050, Cl. 359-341.000.
Gravener, Roy D.; and Muth, Ross R., to United States Surgical Corporation. Pressurized powder support for treating processes. 5,160,677, Cl. 264-101.000.
Gravener, Roy D.; and Muth, Ross R., to United States Surgical Corporation. Pressurized powder support for treating processes. 5,160,678, Cl. 264-101.000.
Gravenstede, Kenneth N.: *See*—
Carter, Jeffery A.; Otsubo, Peggy M.; Gravenstede, Kenneth N.; and Grotz, Robert A., 5,161,230, Cl. 395-800.000.
Graville, Steven W.; and Reese, Clifford C., to Dow Corning Corporation. Method for compacting silica fume. 5,160,470, Cl. 264-123.000.
Gray, Gregory G., to JLG Industries, Inc. Load moment indicator system. 5,160,055, Cl. 212-150.000.
Great Western Foam Products Corporation: *See*—
Bontrager, Rick L., 5,160,473, Cl. 264-138.000.
Greatting, Allen D.: *See*—
Parks, Laura L.; and Greatting, Allen D., 5,160,758, Cl. 426-506.000.
Greco, Giorgio: *See*—
Cocito, Giuseppe; and Greco, Giorgio, 5,160,973, Cl. 356-73.100.
Greenawald, Michael A., to Uarco Incorporated. Battery shipping container. 5,160,025, Cl. 206-333.000.
Greenberg, Jeffry A.: *See*—
Follmer, William C.; Greenberg, Jeffry A.; and Messih, Isis A., 5,159,914, Cl. 123-494.000.
Greene, Jack T. Process for making particle board including the use of acetoacetamide as a formaldehyde scavenger. 5,160,679, Cl. 264-109.000.
Greenstreet, Peter T.: *See*—
Ferraro, John R.; Foerster, Philip P.; Greenstreet, Peter T.; Schwarz, Steven R.; and Turgeon, Milton R., 5,160,101, Cl. 244-118.100.
Greer, Thomas W., to Reliable Corporation of America, The. Multiple bingo game apparatus. 5,160,146, Cl. 273-269.000.
Gregory, Peter; and Quayle, Arthur, to Imperial Chemical Industries PLC. Security coding. 5,160,171, Cl. 283-91.000.
Grey, Henry: *See*—
Melnyk, Andrew R.; Herbert, William G.; and Grey, Henry, 5,160,421, Cl. 205-67.000.
Griesinger, David H., to Lexicon, Inc. Acoustic analysis. 5,161,197, Cl. 381-56.000.
Griffin Corporation: *See*—
Misselbrook, John; Hoff, Edwin F., Jr.; Bergman, Elliot; McKinney, Larry J.; and LeFiles, James H., 5,160,530, Cl. 71-121.000.
Griffin, Michael R.; George, Daryl D.; and Jones, Curtis R., Jr., to Compaq Computer Corporation. Computer interface for the configuration of computer system and circuit boards. 5,161,102, Cl. 395-800.000.
Grilliot, Mary I.: *See*—
Senser, Karl E.; and Lewis, Patricia K., 5,159,721, Cl. 2-227.000.
Grilliot, William L.: *See*—
Senser, Karl E.; and Lewis, Patricia K., 5,159,721, Cl. 2-227.000.
Grimm, C. Louis. Rotary vee engine with through-piston induction. 5,159,902, Cl. 123-43.00A.
Grishin, Sergei F.: *See*—
Spitsin, Valentin M.; Karetnikov, Evgeny V.; Grishin, Sergei F.; Ivanov, Andrei A.; and Gorberg, Boris L., 5,160,592, Cl. 204-164.000.
Griswold, Marsden P.: *See*—
Everett, Patrick N.; Delaney, William F.; and Griswold, Marsden P., 5,160,959, Cl. 355-53.000.
Groman, Ernest V.: *See*—
Josephson, Lee; Groman, Ernest V.; and Palmacci, Stephen, 5,160,726, Cl. 424-9.000.
Grosch, Hermann, to Rheinmetall GmbH. Method of determining the target direction and target range of sound generating targets. 5,161,127, Cl. 367-124.000.
Groshong, LeRoy E.: *See*—
Reger, Vincent A.; Kelly, Thomas L.; and Groshong, LeRoy E., 5,160,342, Cl. 606-200.000.
Gross, Peter S.; Bollensen, Eric; and Rajendren, Richard, to Aeromix Systems, Incorporated. Bearing protection device for liquid aerators. 5,160,667, Cl. 261-91.000.
Grotz, Robert A.: *See*—
Carter, Jeffery A.; Otsubo, Peggy M.; Gravenstede, Kenneth N.; and Grotz, Robert A., 5,161,230, Cl. 395-800.000.
Group Dekko International: *See*—
Marsh, John K.; and Welch, V. Richard, 5,160,276, Cl. 439-502.000.
Grube, Gary W.: *See*—
Diaz, Rafael J.; and Grube, Gary W., 5,161,154, Cl. 370-95.100.
Gruber, Mark B., to Du Pont de Nemours, E. I., and Company. Method for winding a plurality of lengths of thermoplastic resin impregnated yarns using a heated guide eye. 5,160,561, Cl. 156-175.000.
Gruber, Mark B., to Du Pont de Nemours, E. I., and Company. Apparatus including a heated guide eye for winding a plurality of lengths of thermoplastic resin impregnated yarns. 5,160,568, Cl. 156-430.000.
Gruma S.A. de C.V.: *See*—
Montemayor, Ezequiel d.; Ollervides, Marina T.; and Gonzalez, Rita M., 5,160,377, Cl. 118-13.000.
Grutter, Peter J.; Stock, Gerald G.; Cushing, John A.; and Gopp, Alexander Y., to Ford Motor Company. Catalytic converter monitoring using downstream oxygen sensor. 5,159,810, Cl. 60-274.000.
GTE Government Systems Corporation: *See*—
Faber, Sol, 5,160,357, Cl. 55-385.200.
GTE Products Corporation: *See*—
Culver, John F.; Seymour, Douglas G.; and Humphrey, James C., 5,160,281, Cl. 439-692.000.
Dutta, Arunava; and Dullea, Leonard V., 5,160,663, Cl. 252-301.40R.
Guarnaschelli, Claudio; and Guarnaschelli, Marco G. Fluid mixer. 5,160,459, Cl. 261-92.000.
Guarnaschelli, Marco G.: *See*—
Guarnaschelli, Claudio; and Guarnaschelli, Marco G., 5,160,459, Cl. 261-92.000.
Guerra, Daniel; and Sicard, Thierry M. A., to Siemens Aktiengesellschaft. Device for sensing and discriminating operational faults in an electrical power supply. 5,161,112, Cl. 364-483.000.
Gummow, Rosalind J.: *See*—
Thackery, Michael M.; and Gummow, Rosalind J., 5,160,712, Cl. 423-138.000.
Gunderson, Dennis E.; and Gunderson, Eric G. Method for filtering aquarium water. 5,160,622, Cl. 210-617.000.
Gunderson, Eric G.: *See*—
Gunderson, Dennis E.; and Gunderson, Eric G., 5,160,622, Cl. 210-617.000.
Gunnerson, Fred S.; Sanderlin, F. Dave; Iurato, Joy R.; and Padilla, Antonio A., to Florida Power Corporation. Controllable heat pipes for thermal energy transfer. 5,159,972, Cl. 165-32.000.
Gupta, Amar: *See*—
Lampson, Butler W.; Hawe, William R.; Gupta, Amar; and Spinney, Barry A., 5,161,193, Cl. 380-49.000.
Gupta, Shanti S.; and Morris, Darryl C. Encryption system for time division multiplexed networks. 5,161,191, Cl. 380-37.000.
Gururangan, Raghuraman, to Quantum Corporation. Disk assembly with thermally isolated in-hub stindle motor. 5,160,865, Cl. 310-67.00R.
Gutwein, Roger W.: *See*—
Kirkpatrick, Steven J.; Bertagna, Richard W.; and Gutwein, Roger W., 5,160,757, Cl. 426-466.000.
Gynelab, Inc.: *See*—
Neuwirth, Robert S.; and Bolduc, Lee R., 5,159,925, Cl. 128-401.000.
H. Stoll GmbH & Co.: *See*—
Schmid, Franz; and Walker, Fritz, 5,159,822, Cl. 66-126.00R.
H. W. Andersen Products, Inc.: *See*—
Anderson, Harold W.; and Harrison, Charles H., 5,160,700, Cl. 422-34.000.
Haapanen, Randy M. Noise baffle for drain pipes. 5,159,789, Cl. 52-16.000.
Habbersett, John I.; and Westfall, Norman R., to Caldwell Manufacturing Company. Jamb liner slot cover. 5,159,794, Cl. 52-207.000.
Habeeb, Jacob J.; and Beltzer, Morton, to Exxon Research and Engineering Co. Lubricating oil containing O-alkyl-N-alkoxycarbonylth-

ionocarbamate salts of dialkyldithiophosphoric acid (PNE-614). 5,160,644, Cl. 252-32.70E.

Haczek, Werner: *See—*
Haftmann, Johannes; and Haczek, Werner, 5,160,206, Cl. 400-250.000.

Hadank, John M.: *See—*
Allen, William E.; Anderson, Paul D.; Bradbury, Walter J.; Hadank, John M.; and League, Richard B., 5,160,239, Cl. 414-699.000.

Hadasit Medical Research Services and Development: *See—*
Kloha, Wayne; and Ramu, Avner, 5,160,727, Cl. 424-10.000.

Hadfield, Robert W., to Butler Manufacturing Company. Access means for flush floor fitting. 5,160,808, Cl. 174-48.000.

Haftmann, Johannes; and Haczek, Werner, to Ta Triumph-Adler Aktiengesellschaft. Holder of a ribbon with supply and take-up spools for typewriters or similar machines. 5,160,206, Cl. 400-250.000.

Hager, James R., to Honeywell Inc. Radar altimeter with self-calibration feature. 5,160,933, Cl. 342-174.000.

Hagstrom, Lauren M.: *See—*
DeRosa, John; Hagstrom, Lauren M.; Hilde, Lon S.; and Wiesler, Oren, 5,160,922, Cl. 340-825.500.

Haidari, Mehdi S.: *See—*
Forbord, Kent J.; and Haidari, Mehdi S., 5,161,074, Cl. 360-97.010.

Hair, Robert L.: *See—*
Lee, Fu-Ming; Hair, Robert L.; and Brown, Ronald E., 5,160,414, Cl. 203-57.000.

Hakamian, Mohammad, to Teledyne Kinetics. Floating stackable connector. 5,160,268, Cl. 439-66.000.

Hakkaku, Kunio; Tomoda, Susumu; Morita, Satosi; Masuda, Akira; and Odagiri, Sinji, to Fuji Photo Film Co., Ltd. Apparatus for reading and recording information of characters, images, or the like. 5,161,038, Cl. 358-496.000.

Halbach, Charles M. Hypodermic syringe sheath holder, combination using same and handling method. 5,160,324, Cl. 604-192.000.

Hall, George R., II: *See—*
Fry, John J.; and Hall, George R., II, 5,160,807, Cl. 174-35.00R.

Hall, Warren E.: *See—*
Bosworth, Mark E.; Dunn, Thomas J.; Hall, Warren E.; Johnson, Richard G.; Kneller, Mills T.; Lin, Youlin; Wallace, Rebecca A.; White, David H.; and Wong, David M., 5,160,437, Cl. 210-651.000.

Halliburton Company: *See—*
Frost, Jack G.; and Snyder, Kenneth J., 5,160,631, Cl. 210-720.000.
Onan, David D.; Davis, Garland W.; and Cromwell, Roger S., 5,159,980, Cl. 166-294.000.

Halliburton Logging Services, Inc.: *See—*
Tomek, Martin L.; and Stradley, Kirk K., 5,159,978, Cl. 166-250.000.

Halloran, Daniel J., to Dow Corning Corporation. Shampoo suspension containing amine functional polydiorganosiloxane. 5,160,449, Cl. 252-174.150.

Halm, Roland L.; and Zapp, Regie H., to Dow Corning Corporation. Metal catalyzed production of tetrachlorosilane. 5,160,720, Cl. 423-342.000.

Halsey, Carl C.; and Berry, Sharon L., to United States of America, Navy. Method for preparing a storage container for explosive rounds. 5,160,468, Cl. 264-112.000.

Hamada, Hiroshi, to Sharp Kabushiki Kaisha. Color liquid crystal display device using dichroic mirrors for focusing different colors in different directions. 5,161,042, Cl. 359-41.000.

Hamada, Mitsuo; Sakuma, Atsushi; and Shimizu, Koji, to Dow Corning Toray Silicone Co., Ltd. Method of manufacturing silicone rubber moldings. 5,160,670, Cl. 264-6.000.

Hamamoto, Syougo: *See—*
Tukiyama, Yasutaka; Itami, Tadashi; Okada, Yosuhiro; and Hamamoto, Syougo, 5,160,873, Cl. 318-254.000.

Hamasaka, Hiroshi: *See—*
Fukushima, Yoshihisa; Satoh, Isao; Takagi, Yuji; Azumatani, Yasushi; and Hamasaka, Hiroshi, 5,161,143, Cl. 369-53.000.

Hammarstrom, Janet L.: *See—*
Carman, Lee A.; Coblenz, William S.; and Hammarstrom, Janet L., 5,160,509, Cl. 51-307.000.

Hamprecht, Gerhard: *See—*
Mayer, Horst; Hamprecht, Gerhard; Westphalen, Karl-Otto; Walter, Helmut; and Gerber, Matthias, 5,160,365, Cl. 71-93.000.

Hampton, John R.; and Asher, Thomas L., to Filtration Technology Corporation. Method of cleaning a disposable cartridge filter. 5,160,442, Cl. 210-791.000.

Hamuro, Mitsuro; and Konishi, Toru, to Murata Manufacturing Co., Ltd. Apparatus for aligning electronic component chips. 5,160,066, Cl. 221-172.000.

Hanada, Yoshikazu, to Fuji Photo Film Co., Ltd. Sheet conveying/sorting system. 5,160,132, Cl. 271-265.000.

Haneda, Satoshi; Morita, Shizuo; Fukuchi, Masakazu; and Matsuo, Shunji, to Konica Corporation. Image forming apparatus having process cartridge. 5,160,963, Cl. 355-200.000.

Hanley, Donald V.: *See—*
Meche, Paul S.; Hanley, Donald V.; and Chaplain, Eugenie M., 5,161,249, Cl. 455-33.300.

Hanna, Jun-Ichi: *See—*
Ishihara, Shunichi; Hirooka, Masaaki; Hanna, Jun-Ichi; and Shimizu, Isamu, 5,160,543, Cl. 118-715.000.

Hannam, Clifford; and Harwood, Gerald A., to Hitech Metal Detectors Limited. Metal detecting apparatus and apparatus including guide housing for guiding a metal test piece, for testing metal detecting apparatus. 5,160,885, Cl. 324-202.000.

Hannick, John J.: *See—*
Lemire, Robert J.; and Hannick, John J., 5,160,119, Cl. 251-212.000.

Hannon, Charles N., to Stepper, Inc. Method and apparatus for taping closed the open edge of an assembled newspaper having loose contents. 5,159,798, Cl. 53-415.000.

Hanson, Alden B.: *See—*
Drew, Terrence M.; Hanson, Chris A.; and Hanson, Alden B., 5,159,717, Cl. 2-20.000.

Hanson, Chris A.: *See—*
Drew, Terrence M.; Hanson, Chris A.; and Hanson, Alden B., 5,159,717, Cl. 2-20.000.

Hanzawa, Kohtaro: *See—*
Morikawa, Shigenori; Hanzawa, Kohtaro; Sasaki, Hiroyuki; and Morokuma, Hiroshi, 5,160,798, Cl. 84-615.000.

Hara, Kazuhiko: *See—*
Yasui, Takashi; Fukushima, Masanobu; and Hara, Kazuhiko, 5,161,228, Cl. 395-725.000.

Hara, Mitsuo: *See—*
Abe, Tomoaki; Maeda, Katsuya; Hara, Mitsuo; Kamio, Shigeru; and Takao, Mitsunori, 5,159,990, Cl. 180-197.000.

Hara, Takehiko: *See—*
Inoue, Hiroshi; Hara, Takehiko; and Hidano, Kengo, 5,159,830, Cl. 73-118.100.

Hara, Toshiyuki; and Shirahama, Katsunori, to Ohi Seisakusho Co., Ltd.; and Nissan Motor Co., Ltd. Shift position indicating device for automatic transmission. 5,159,892, Cl. 116-28.100.

Harada, Takashi; Fujimura, Susumu; Higashiyama, Masahide; and Tokita, Hidetoshi, to Ube Industries, Ltd. Water purifying apparatus. 5,160,038, Cl. 210-149.000.

Harada, Takashi; Hatakeyama, Ken-ichi; Masuda, Norio; Fujihara, Noboru; and Inomata, Masayuki, to NEC Corporation. Electromagnetic shielding member and electromagnetic shielding case. 5,160,806, Cl. 174-35.0GC.

Harada, Yutaka; Yano, Shinichiro; Miyake, Mutsuko; Kawabe, Ushio; and Nishino, Toshikazu, to Hitachi, Ltd. Superconducting device. 5,160,983, Cl. 257-34.000.

Harbaugh, David L.: *See—*
Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,161,104, Cl. 364-410.000.

Harcros Pigments, Inc.: *See—*
Dow, Warren A., 5,159,962, Cl. 141-98.000.

Harding, Lewis R. Frame structure. 5,159,790, Cl. 52-86.000.

Hardison, Leslie C., to ARI Technologies, Inc. Continuous autocirculation, multiple zone mass transfer apparatus and method. 5,160,714, Cl. 423-220.000.

Harimoto, Kazuyoshi, to NTN Corporation. Roller follower for engine. 5,159,852, Cl. 74-559.000.

Harman International Industries, Incorporated: *See—*
McCorkle, David P., 5,160,896, Cl. 330-251.000.

Harmonic Lightwaves, Inc.: *See—*
Nazarathy, Moshe; Berger, Josef; and Kagan, Yishai, 5,161,044, Cl. 359-157.000.

Harpell, Gary A.: *See—*
Li, Hsin L.; Prevorsek, Dusan C.; Harpell, Gary A.; and Kwon, Young D., 5,160,776, Cl. 428-109.000.

Harradine, Vincent C., to Sony Corporation. Hue control for color video systems. 5,161,005, Cl. 358-28.000.

Harris, Kevin M.; and Mydlack, Thomas L., to Acushnet Company. Printing ink for golf balls. 5,160,536, Cl. 106-19.00R.

Harris, Richard H., to International Business Machines Corporation. Fail safe display for shelf labels. 5,160,920, Cl. 340-765.000.

Harris, William C., Jr.: *See—*
Adams, John M.; Chance, Christopher N.; DeBlasio, James A.; Evers, Donald H.; Harris, William C., Jr.; Kirby, Michael A., Sr.; Newsome, Reginald W.; Pham, Xuan M.; and Talley, Robert E., 5,160,023, Cl. 206-256.000.

Harrison, Charles H.: *See—*
Anderson, Harold W.; and Harrison, Charles H., 5,160,700, Cl. 422-34.000.

Harrison, David F.: *See—*
Walters, David L.; Healy, Martin; Marlow, Ernest C.; and Harrison, David F., 5,160,972, Cl. 356-32.000.

Harry, Alan J.: *See—*
Pettigrew, Robert M.; Harry, Alan J.; Nailor, Paul R.; Adelmann, Fred; Franzen, Peter; and Schoon, Juergen, 5,160,943, Cl. 346-76.0PH.

Hart, Walter F., Jr.: *See—*
Fleming, Robert L., Jr.; Hart, Walter F., Jr.; Lindall, Edward V., Jr.; Reid, Ronnie D.; and Stewrat, John A., III, 5,159,733, Cl. 26-93.000.

Hartel, Gunter; Schurfeld, Armin; Losing, Karl-Henrich; Thonnessen, Dieter; and Remde, Ulrich, to Pierburg GmbH. Process and apparatus for utilization of fuels with alcohol additives for an internal combustion engine. 5,159,898, Cl. 123-1.00A.

Hartman, Robert A.; and Sakai, Toru, to U.S. Philips Corporation. Display device. 5,161,237, Cl. 359-54.000.

Harwood, Gerald A.: *See—*
Hannam, Clifford; and Harwood, Gerald A., 5,160,885, Cl. 324-202.000.

Hasebe, Nobukatsu: *See—*
Hasebe, Nobuyasu; and Hasebe, Nobukatsu, 5,159,885, Cl. 110-346.000.

Hasebe, Nobuyasu; and Hasebe, Nobukatsu. Process for incinerating solid wastes and a process for treating solid wastes and a process for

treating gases generated through incineration of these wastes. 5,159,885, Cl. 110-346.000.
Hasegawa, Etsuo; Takeoka, Shinji; Ohno, Hiroyuki; Nishide, Hiroyuki; and Tsuchida, Eishun, to Nippon Oil & Fats Co., Ltd. Macromolecular endoplasmic reticulum. 5,160,740, Cl. 424-450.000.
Hasegawa, Isahiro: *See*—
Kaga, Yasuhiro; Hattori, Kei; Hasegawa, Isahiro; and Komatsu, Fumio, 5,161,201, Cl. 382-8.000.
Hasegawa Kagaku Kogyo Kabushiki Kaisha: *See*—
Hasegawa, Shigeji, 5,160,135, Cl. 273-67.00A.
Hasegawa, Osamu: *See*—
Marutsuka, Toshinori; and Hasegawa, Osamu, 5,160,452, Cl. 252-309.000.
Hasegawa, Shigeji, to Hasegawa Kagaku Kogyo Kabushiki Kaisha. Stick. 5,160,135, Cl. 273-67.00A.
Hasegawa, Takanori; and Ikejima, Shoichi, to Riso Kagaku Corporation. Process for producing a thermal stencil master sheet for stencil printing. 5,160,564, Cl. 156-231.000.
Hashimoto, Sadaaki; and Tomiyama, Takeshi, to Kansai Paint Company, Limited. Transfer sheet for marking. 5,160,778, Cl. 428-195.000.
Hashimoto, Takao: *See*—
Nagasaki, Yoshimi; Hashimoto, Takao; Takemura, Isao; Imai, Hiroshi; Hirama, Yasunobu; and Nakajima, Tadayoshi, 5,160,621, Cl. 210-614.000.
Hashizume, Hideki: *See*—
Seki, Masafumi; Hashizume, Hideki; Nakama, Kenichi; and Kobayashi, Shigeru, 5,160,360, Cl. 65-30.130.
Hashizume, Kinji: *See*—
Etou, Ryoukichi; Hashizume, Kinji; Ikeda, Mitsuo; and Asada, Hideo, 5,159,818, Cl. 62-137.000.
Hatakeyama, Ken-ichi: *See*—
Harada, Takashi; Hatakeyama, Ken-ichi; Masuda, Norio; Fujihara, Noboru; and Inomata, Masayuki, 5,160,806, Cl. 174-35.0GC.
Hattori, Kei: *See*—
Kaga, Yasuhiro; Hattori, Kei; Hasegawa, Isahiro; and Komatsu, Fumio, 5,161,201, Cl. 382-8.000.
Hattori, Takamasa. Sprinkler head. 5,159,984, Cl. 169-38.000.
Hauck Manufacturing Company: *See*—
O'Hara, John; Fuhrman, Fred L.; Wolfe, David R.; and Irwin, Bruce C., 5,160,259, Cl. 432-37.000.
Haug, Werner, to Frama AG. Franking machine. 5,161,108, Cl. 364-464.020.
Hauzer, Fransiscus J. M.; Munz, Wolf-Dieter; Buil, Boudewijn J. A. M.; Schulze, Dietmar; and Tietema, Roel, to Hauzer Holding B.V. Arc-magnetron and the method of coating. 5,160,595, Cl. 204-192.380.
Hauzer Holding B.V.: *See*—
Hauzer, Fransiscus J. M.; Munz, Wolf-Dieter; Buil, Boudewijn J. A. M.; Schulze, Dietmar; and Tietema, Roel, 5,160,595, Cl. 204-192.380.
Havens, Haven M.: *See*—
Bell, David H.; Fortier, Joseph E. F.; and Havens, Haven M., 5,160,637, Cl. 210-766.000.
Havice, Jacque L.: *See*—
Mohler, Jack M.; and Havice, Jacque L., 5,160,919, Cl. 340-711.000.
Hawe, William R.: *See*—
Lampson, Butler W.; Hawe, William R.; Gupta, Amar; and Spinney, Barry A., 5,161,193, Cl. 380-49.000.
Hayakawa, Kimiaki: *See*—
Ueda, Noriyoshi; and Hayakawa, Kimiaki, 5,160,399, Cl. 156-359.000.
Hayashi, Mineo: *See*—
Sugawara, Yukio; Hayashi, Mineo; Konishi, Junji; and Hayashi, Shosaku, 5,160,588, Cl. 204-109.000.
Hayashi, Norihiko: *See*—
Yoshimatsu, Hideaki; Hayashi, Norihiko; and Kinugawa, Hideki, 5,160,056, Cl. 212-155.000.
Hayashi, Shosaku: *See*—
Sugawara, Yukio; Hayashi, Mineo; Konishi, Junji; and Hayashi, Shosaku, 5,160,588, Cl. 204-109.000.
Hayashi, Toshihiro; Takeda, Satoru; Yamazaki, Shyoichiro; Sugie, Masayuki; and Iwaki, Norio, to Asahi Denka Kogyo Kabushiki Kaisha. Dough of pie, etc. having a slit roll configuration. 5,160,754, Cl. 426-94.000.
Hayashida, Shigeru: *See*—
Morishita, Yoshii; Sugimoto, Yasushi; Hayashida, Shigeru; Ishikawa, Hiroko; Noda, Yoshiaki; Murakami, Shigeru; Sato, Munehiro; Saito, Yoshinori; Kurata, Naoji; and Sugita, Yoshio, 5,160,487, Cl. 430-59.000.
Haygarth, John C.: *See*—
Ash, Kenneth C.; Crocker, William A.; Haygarth, John C.; Lee, David R.; Morris, Donald; Peterson, John R.; Riesen, Jon A.; and Yih, Robert S., 5,160,482, Cl. 423-75.000.
Hayward, Charles R.; Lanzillotti, Harry V.; Merrill, David E.; Sanders, Edward B.; Losee, D. Bruce, Jr.; and Hearn, John R., to Philip Morris Incorporated. Smoking article. 5,159,940, Cl. 131-194.000.
Hazen, William J.: *See*—
Hubert, Thomas G.; Stich, Frederick A.; Hazen, William J.; and Mills, Ricky, 5,160,832, Cl. 235-145.00R.
Healy, Martin: *See*—
Walters, David L.; Healy, Martin; Marlow, Ernest C.; and Harrison, David F., 5,160,972, Cl. 356-32.000.
Hearn, John R.: *See*—
Hayward, Charles R.; Lanzillotti, Harry V.; Merrill, David E.; Sanders, Edward B.; Losee, D. Bruce, Jr.; and Hearn, John R., 5,159,940, Cl. 131-194.000.
Heffernen, Steven A.: *See*—
Hochella, William A.; and Heffernen, Steven A., 5,160,722, Cl. 423-403.000.
Hefler, Gregory W.; and Evancik, Michael J., to Caterpillar Inc. Flexible coupling device for use in an engine manifold system. 5,159,811, Cl. 60-322.000.
Hehl, Karl. Coolant distributing and flow control apparatus for maintaining a constant temperature-controllable region of an injection molding machine. 5,159,957, Cl. 137-883.000.
Heidelberg Harris, Inc.: *See*—
Donelan, Michael E.; and Hern, Joel C., 5,159,878, Cl. 101-217.000.
Heideman, Robert J.; and Mitera, Richard T., to Enertrols, Inc. Miniature shock absorber. 5,159,997, Cl. 188-282.000.
Heieren, Bruce G.: *See*—
De Simone, Mitch D.; and Heieren, Bruce G., 5,160,606, Cl. 210-110.000.
Heinecke, Steven B.; and Peterson, Donald G., to Minnesota Mining and Manufacturing Company. Combined adhesive strip and transparent dressing delivery system. 5,160,315, Cl. 602-57.000.
Heino, Jukka; and Kobonen, Raimo, to A. Ahlstrom Corporation. Filter cylinder with drainage surface. 5,160,434, Cl. 210-391.000.
Heisler, Mark D.: *See*—
Pemawansa, Kariyawasam P. W.; Heisler, Mark D.; and Kraus, Menahem, 5,160,626, Cl. 210-638.000.
Held, Peter: *See*—
Weid, Helmut; and Held, Peter, 5,159,757, Cl. 30-251.000.
Helling, Daniel J.: *See*—
Helling, Robert W.; Helling, Daniel J.; and Rogers, Dean V., 5,159,895, Cl. 119-3.000.
Helling, Robert W.; Helling, Daniel J.; and Rogers, Dean V. Packaged article assembly. 5,159,895, Cl. 119-3.000.
Hemker, David J.: *See*—
Latchford, Ian S.; Vasquez, Patrica; Hemker, David J.; and Petit, Brigitte, 5,160,407, Cl. 156-656.000.
Henig, Hans. Apparatus for drying galvanized mass-produced parts. 5,159,766, Cl. 34-77.000.
Henley, Julian L. Iontophoretic drug delivery apparatus. 5,160,316, Cl. 604-20.000.
Hentz, Lawrence H., Jr.: *See*—
Murray, Charles M.; Thompson, Joel L.; and Hentz, Lawrence H., Jr., 5,160,707, Cl. 422-170.000.
Hepp, Klaus: *See*—
Waschkies, Eckhard; and Hepp, Klaus, 5,159,836, Cl. 73-587.000.
Herbein, William C.: *See*—
Lambing, Cynthia L. T.; Colpo, James A.; and Herbein, William C., 5,160,771, Cl. 428-57.000.
Herbert, William G.: *See*—
Melnyk, Andrew R.; Herbert, William G.; and Grey, Henry, 5,160,421, Cl. 205-67.000.
Hercules Incorporated: *See*—
Antoon, Mitchell K., Jr., 5,160,768, Cl. 428-35.200.
Herd, Josef: *See*—
Thomas, Hermann; and Herd, Josef, 5,159,868, Cl. 83-674.000.
Hermann, Karl: *See*—
Frankeny, Jerome A.; Frankeny, Richard F.; Hermann, Karl; and Wustrau, Rolf, 5,161,087, Cl. 361-382.000.
Hermant, Eric: *See*—
Ciais, Jean-Pierre; and Hermant, Eric, 5,159,809, Cl. 60-225.000.
Hermco: *See*—
Kambara, Goro, 5,160,238, Cl. 414-663.000.
Hern, Joel C.: *See*—
Donelan, Michael E.; and Hern, Joel C., 5,159,878, Cl. 101-217.000.
Herpichboehm, Bernd G.: *See*—
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,979, Cl. 356-423.000.
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,980, Cl. 356-423.000.
Herring, J. Stephen, to United States of America, Energy. Toroidal constant-tension superconducting magnetic energy storage units. 5,160,911, Cl. 335-216.000.
Herzner, Fredrick C.; Juenger, Jerome A.; and Wayte, Peter, to General Electric Company. Turbine blade wear protection system with multilayer shim. 5,160,243, Cl. 416-220.00R.
Herzog, Kenneth J. Ball cap orienter. 5,159,797, Cl. 53-312.000.
Hesse, Kurt. Toy vehicle track. 5,160,091, Cl. 238-10.00E.
Hewitt, Bryan C.: *See*—
Ball, Melville D.; Gallerneault, Christine E.; Hewitt, Bryan C.; and Lorenson, Claude P., 5,160,819, Cl. 219-10.55A.
Hewlett-Packard Company: *See*—
Crawford, Robert K.; Leibovitz, Jacques; Miller, Daniel J.; and Chen, Kim H., 5,161,090, Cl. 361-383.000.
Lovelock, James E., 5,160,511, Cl. 55-16.000.
Wang, Shih-Yuan; and Renne Ty Tan, Michael, 5,160,492, Cl. 437-22.000.
Zorabedian, Paul, 5,161,165, Cl. 372-20.000.
Hexcel-Genin: *See*—
Jaillet, Bernard; and Berthier, Jean-Marc, 5,160,485, Cl. 428-116.000.
Heym, Hans-Udo: *See*—
Garschagen, Friedrich A.; and Heym, Hans-Udo, 5,159,741, Cl. 29-27.00R.
Hibler, Donald R.; and Hinrichs, James O., to Fike Corporation. Reverse bulged forward acting scored rupture disc bulkhead structure for multi-stage rocket motor. 5,160,070, Cl. 60-250.000.

Hickman, James A. A., to Miller Construction Limited. Wired glass. 5,160,782, Cl. 428-245.000.

Hicks, Richard E.; and Fenner, Richard R. System for purifying air in a room. 5,160,517, Cl. 55-385.100.

Hidaka Seiki Kabushiki Kaisha: *See*—
Miyazawa, Toshiki; Sakaguchi, Masahide; and Okabe, Hideki, 5,159,826, Cl. 72-358.000.

Hidano, Kengo: *See*—
Inoue, Hiroshi; Hara, Takehiko; and Hidano, Kengo, 5,159,830, Cl. 73-118.100.

Hieda, Teruo: *See*—
Nakayama, Satoshi; and Hieda, Teruo, 5,161,236, Cl. 358-22.000.

Higashihara, Akihito: *See*—
Ito, Koichi; Higashihara, Akihito; and Sugi, Hikaru, 5,160,115, Cl. 251-129.120.

Higashiyama, Masahide: *See*—
Harada, Takashi; Fujimura, Susumu; Higashiyama, Masahide; and Tokita, Hidetoshi, 5,160,038, Cl. 210-149.000.

Hight, Andrew T.: *See*—
Falou, Mohamad S.; Finch, Timothy D.; Garner-Gray, Peter F.; Hight, Andrew T.; Murphy, Martin M.; Newbold, Geoffrey; Niven, Ian E.; and Savill, Derek G., 5,160,654, Cl. 252-91.000.

Higuchi, Harukazu; and Shibano, Yoshizo, to Sumitomo Electric Industries, Ltd. Diversity antenna communication system. 5,161,252, Cl. 455-78.000.

Higuchi, Takayoshi; and Sugiura, Souichi, to Kabushiki Kaisha Toshiba. Semiconductor device with composite surface insulator. 5,160,988, Cl. 257-301.000.

Hilde, Lon S.: *See*—
DeRosa, John; Hagstrom, Lauren M.; Hilde, Lon S.; and Wiesler, Oren, 5,160,922, Cl. 340-825.500.

Hildenbrand, Karlheinz; Hugl, Herbert; and Dhein, Rolf, to Miles Inc. Asymmetric sandwich membrane system having reduced ascorbate interference. 5,160,436, Cl. 210-638.000.

Hill, George. Personnel transfer system. 5,160,286, Cl. 441-80.000.

Hill, James D., to Tandem Scanning Corporation. Stereoscopic tandem scanning reflected light confocal microscope. 5,161,052, Cl. 359-377.000.

Hill, Michael F., to Nova Corporation of Alberta. In-ground securement of pipelines and the like. 5,160,218, Cl. 405-154.000.

Hilmar, Martin D.: *See*—
Najjar, Mitri S.; and Hilmar, Martin D., 5,160,352, Cl. 55-16.000.

Hinckley, C. Douglas, to Boeing Company, The. Vibration driven hot knife for separating bonded assemblies. 5,159,865, Cl. 83-16.000.

Hines, William R.; and Farrell, William M., to General Electric Company. Gas turbine engine and method of operation for providing increased output shaft horsepower. 5,160,080, Cl. 60-39.040.

Hinrichs, James O.: *See*—
Hibler, Donald R.; and Hinrichs, James O., 5,160,070, Cl. 60-250.000.

Hirahara, Kazuhiro: *See*—
Mihira, Hiroshi; Shimizu, Tetsuo; Hirahara, Kazuhiro; Ishihara, Toshinobu; and Takaya, Seiki, 5,160,542, Cl. 118-715.000.

Hirai, Tokyuki: *See*—
Kugimiya, Shuzo; Fukumochi, Yoji; Sata, Ichiko; Hirai, Tokyuki; and Suzuki, Hitoshi, 5,161,105, Cl. 364-419.000.

Hiraki, Akitoshi, to Hitachi Metals Ltd. Titanium-tungsten target material for sputtering and manufacturing method therefor. 5,160,534, Cl. 75-248.000.

Hirama, Yasunobu: *See*—
Nagasaki, Yoshimi; Hashimoto, Takao; Takemura, Isao; Imai, Hiroshi; Hirama, Yasunobu; and Nakajima, Tadayoshi, 5,160,621, Cl. 210-614.000.

Hiramatsu, Makoto, to Canon Kabushiki Kaisha. Magneto-optical recording apparatus including a magnetic head of a pneumatic floating type. 5,161,132, Cl. 369-13.000.

Hirane, Hideo; Tanno, Kiyohiko; and Masuda, Kazuhito, to Hitachi, Ltd.; and Hitachi Cable Ltd. Light emitter array diagnostic apparatus. 5,160,837, Cl. 250-208.200.

Hirano, Sachiyo, to Pioneer Electronic Corporation. Preset scanning method for radio receivers. 5,161,253, Cl. 455-161.300.

Hirao, Kouji: *See*—
Mouri, Naoki; Hirao, Kouji; and Aoyama, Mutsuro, 5,160,162, Cl. 280-707.000.

Hirasawa, Shigemi, to Hitachi, Ltd. Color picture tube manufacturing method. 5,160,287, Cl. 445-40.000.

Hirashima, Takuya, to Fuji Photo Film Co., Ltd. Method of measuring the reflection density of an image. 5,160,981, Cl. 356-446.000.

Hirata, Masukazu: *See*—
Kondo, Osamu; Hirata, Masukazu; and Arii, Mitsuzo, 5,160,358, Cl. 65-18.200.

Hirono, Tatsuo: *See*—
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.

Hirooka, Masaaki: *See*—
Ishihara, Shunichi; Hirooka, Masaaki; Hanna, Jun-Ichi; and Shimizu, Isamu, 5,160,543, Cl. 118-715.000.

Hirose Electric Co., Ltd.: *See*—
Nakamura, Masaru; Uekido, Kouzou; and Ukai, Tsunekazu, 5,160,275, Cl. 439-328.000.

Hirose, Masato: *See*—
Gomi, Hiroshi; Kumagai, Tomoharu; Hirose, Masato; and Nishikawa, Masao, 5,159,988, Cl. 180-8.600.

Hishida, Noriaki; and Iwazaki, Kuniyasu, to Nippon Densan Corporation. Spindle motor. 5,160,866, Cl. 310-90.000.

Hitachi Cable Ltd.: *See*—
Hirane, Hideo; Tanno, Kiyohiko; and Masuda, Kazuhito, 5,160,837, Cl. 250-208.200.
Iyoda, Hiroumi; Saito, Chuichi; Shiina, Mamoru; and Fujii, Yoshitaka, 5,160,009, Cl. 198-337.000.

Hitachi Chemical Company, Ltd.: *See*—
Morishita, Yoshii; Sugimoto, Yasushi; Hayashida, Shigeru; Ishikawa, Hiroko; Noda, Yoshiaki; Murakami, Shigeru; Sato, Munehiro; Saito, Yoshinori; Kurata, Naoji; and Sugita, Yoshio, 5,160,487, Cl. 430-59.000.

Hitachi Koki Co., Ltd.: *See*—
Ohshima, Minoru; Morio, Shuichi; Saitoh, Susumu; Namikawa, Osamu; Obara, Kazutoshi; Seino, Minoru; Mochizuki, Takeshi; Nakura, Makoto; Arimoto, Akira; and Kasai, Masuo, 5,161,046, Cl. 359-212.000.

Hitachi, Ltd.: *See*—
Harada, Yutaka; Yano, Shinichiro; Miyake, Mutsuko; Kawabe, Ushio; and Nishino, Toshikazu, 5,160,983, Cl. 257-34.000.
Hirane, Hideo; Tanno, Kiyohiko; and Masuda, Kazuhito, 5,160,837, Cl. 250-208.200.
Hirasawa, Shigemi, 5,160,287, Cl. 445-40.000.
Hojo, Toshiyuki; Tokusa, Kenji; Oguni, Kensaku; and Nakayama, Susumu, 5,159,817, Cl. 62-81.000.
Iyoda, Hiroumi; Saito, Chuichi; Shiina, Mamoru; and Fujii, Yoshitaka, 5,160,009, Cl. 198-337.000.
Kajimoto, Takeshi; Shimbo, Yutaka; Sato, Katsuyuki; Ogata, Masahiro; Kenmizaki, Kanehide; Kubono, Shouji; Kato, Nobuo; Manita, Kiichi; and Kanamitsu, Michitaro, 5,161,120, Cl. 365-189.050.
Kouda, Katsuya; and Iwanaga, Masaharu, 5,161,215, Cl. 395-250.000.
Kuwabara, Takao; and Kita, Eizo, 5,160,244, Cl. 417-36.000.
Ohshima, Minoru; Morio, Shuichi; Saitoh, Susumu; Namikawa, Osamu; Obara, Kazutoshi; Seino, Minoru; Mochizuki, Takeshi; Nakura, Makoto; Arimoto, Akira; and Kasai, Masuo, 5,161,046, Cl. 359-212.000.
Saito, Akihiro, 5,160,864, Cl. 310-54.000.
Saito, Atsushi; Ojima, Masahiro; and Ito, Masaru, 5,161,135, Cl. 369-13.000.
Sunagawa, Masao; and Iwao, Akira, 5,159,738, Cl. 15-326.000.
Taguchi, Kouichi; and Yamada, Shinichi, 5,161,211, Cl. 395-10.000.
Takada, Kunio; Otani, Kenji; and Manabe, Akira, 5,160,216, Cl. 405-92.000.
Todokoro, Hideo; Shinada, Hiroyuki; and Fukuhara, Satoru, 5,160,884, Cl. 324-158.00R.

Hitachi, Ltd: *See*—
Kosaka, Michitaka; Sasaki, Toshiro; Matsumoto, Kuniaki; Akashi, Kichizo; and Suemitsu, Satoru, 5,161,103, Cl. 364-408.000.

Hitachi Metals Ltd.: *See*—
Hiraki, Akitoshi, 5,160,534, Cl. 75-248.000.
Yoshizawa, Yoshihito; Yamauchi, Kiyotaka; and Oguma, Shigeru, 5,160,379, Cl. 148-108.000.

Hitachi VLSI Engineering Corp.: *See*—
Kajimoto, Takeshi; Shimbo, Yutaka; Sato, Katsuyuki; Ogata, Masahiro; Kenmizaki, Kanehide; Kubono, Shouji; Kato, Nobuo; Manita, Kiichi; and Kanamitsu, Michitaro, 5,161,120, Cl. 365-189.050.

Hitech Metal Detectors Limited: *See*—
Hannam, Clifford; and Harwood, Gerald A., 5,160,885, Cl. 324-202.000.

Hlavac, Kenneth A., to B. F. Goodrich Company, The. Controller valve for deicer. 5,160,102, Cl. 244-134.00A.

Hoang, Truc G., to Motorola, Inc. High dielectric micro-trough line filter. 5,160,905, Cl. 333-204.000.

Hoberman, Max. Miniature sensor for mainstream capnometry/capnography instrumentation. 5,159,934, Cl. 128-719.000.

Hoblingre, Andre , to ECIA. Device for fixing in position an adjustable steering column of an automobile vehicle. 5,160,165, Cl. 280-775.000.

Hochella, William A.; and Heffernen, Steven A., to Johnson Matthey, Inc. Low pressure drop, high surface area ammonia oxidation catalyst. 5,160,722, Cl. 423-403.000.

Hochiki Kabushiki Kaisha: *See*—
Ishii, Kanji; and Nagai, Atsushi, 5,160,916, Cl. 340-629.000.

Hochschild, James R., to Texas Instruments Incorporated. Method and apparatus for reducing noise in a digital voltage signal. 5,161,185, Cl. 379-416.000.

Hockett, Wayne B., to Continuous Hose Corporation. Method of making a component pipe coupling. 5,160,688, Cl. 264-275.000.

Hodulik, Wolfgang; and Ruyten, Henricus, to U.S. Philips Corporation. Recording and/or reproducing apparatus. 5,161,239, Cl. 360-137.000.

Hoechst AG: *See*—
Schmelzer, Heinz; and Kuechler, Manfred, 5,160,764, Cl. 427-208.400.

Hoechst Celanese Corporation: *See*—
Cussler, Edward L.; Gillberg-LaForce, Gunilla E.; Sansone, Michael J.; and Schisla, David K., 5,160,627, Cl. 210-639.000.
Goldberg, Harris A.; and Reifenberger, Ronald G., 5,161,147, Cl. 369-100.000.

Hoff, Edwin F., Jr.: *See*—
Misselbrook, John; Hoff, Edwin F., Jr.; Bergman, Elliot; McKinney, Larry J.; and LeFiles, James H., 5,160,530, Cl. 71-121.000.

Hoffend, Donald A., Jr.: *See*—
Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,161,104, Cl. 364-410.000.

Hoffman, Charles J.: *See*—
Holland, James R.; and Hoffman, Charles J., 5,160,191, Cl. 312-405.100.

Hoffmann-La Roche Inc.: *See*—
Schadt, Martin; and Villiger, Alois, 5,160,661, Cl. 252-299.610.

Hohider, David; and Cenky, Mark A., to Therm-O-Disc, Incorporated. Packaging unit for an electrical assembly. 5,161,091, Cl. 361-386.000.

Hojo, Toshiyuki; Tokusa, Kenji; Oguni, Kensaku; and Nakayama, Susumu, to Hitachi, Ltd. Refrigerant path apparatus. 5,159,817, Cl. 62-81.000.

Hoki, Tetsuo: *See*—
Kitakado, Ryuji; Yano, Hironobu; and Hoki, Tetsuo, 5,161,202, Cl. 382-8.000.

Holbrook, James D., to MTS Systems Corporation. Differential pitch thread clamp assembly. 5,160,750, Cl. 425-451.900.

Holecek, Michael G.: *See*—
Siriporn, Charn; Milcarek, Charles S., Jr.; Norman, Ronald J.; Baum, Randon L.; and Holecek, Michael G., 5,160,129, Cl. 271-178.000.

Holland, James R.; and Hoffman, Charles J., to White Consolidated Industries, Inc. Adjustable refrigerator door shelf retainer. 5,160,191, Cl. 312-405.100.

Holliday, Gary G.: *See*—
Corp, Douglas M.; Hyde, Robert W.; Brooks, Frank W., Sr.; Holliday, Gary G.; and Fanelli, Michael W., 5,159,998, Cl. 188-340.000.

Hollming Oy: *See*—
Tammi, Pekka; and Marjoniemi, Kari, 5,160,410, Cl. 162-358.100.

Holmes, Andrew W.: *See*—
Addink, Marvin; Hu, Cheney Y.; Leyba, Todd; Mullen, John J.; Till, Carolyn A.; and Holmes, Andrew W., 5,161,214, Cl. 395-145.000.

Holmes, Gregory A.: *See*—
Marritt, Clifford R.; Oakley, Francis R.; and Holmes, Gregory A., 5,159,939, Cl. 131-84.200.

Holmgren, Jennifer S.; Gembicki, Stanley A.; Schoonover, Michael W.; and Kocal, Joseph A., to UOP. Hydrocarbon conversion process using alumina clay compositions. 5,160,032, Cl. 208-46.000.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Gomi, Hiroshi; Kumagai, Tomoharu; Hirose, Masato; and Nishikawa, Masao, 5,159,988, Cl. 180-8.600.
Kitagawa, Hiroshi; Oono, Tetsuya; and Suzuki, Norio, 5,159,831, Cl. 73-118.100.
Ono, Yukihito, 5,159,952, Cl. 137-505.410.
Shiraishi, Motoatsu; Nagamitsu, Tatsuo; and Nakamura, Mitsuki, 5,159,827, Cl. 72-405.000.
Tsujii, Gen; Kobayashi, Nobuo; and Takano, Fumitomo, 5,160,820, Cl. 219-116.000.
Yoshiji, Takeo; Sato, Yutaka; Takeshima, Akira; and Yoshioka, Teruo, 5,160,011, Cl. 198-345.300.

Honda, Michitaka; and Nakatani, Yoshinori, to Kabushiki Kaisha Toshiba. Image display apparatus for radiation diagnosis. 5,161,178, Cl. 378-99.000.

Honda, Shin: *See*—
Ohishi, Shigeji; Honda, Shin; Sakakibara, Hisayoshi; and Fujiwara, Kenichi, 5,159,820, Cl. 62-468.000.

Hones, Leonard D.: *See*—
Andersen, David A.; Kiefer, Keith A.; and Hones, Leonard D., 5,160,801, Cl. 89-6.000.

Honeywell Inc.: *See*—
Hager, James R., 5,160,933, Cl. 342-174.000.
Rylander, Karen S.; Fant, Karl M.; and Egli, Werner H., 5,161,013, Cl. 358-160.000.
Simon, Tim; and Tong, Lee, 5,160,853, Cl. 307-140.000.

Hong, Ing-Tsann; and Fitch, Ernest C., to Coca-Cola Company, The. Frontal separator system for separating particles from beverage liquids. 5,160,633, Cl. 210-739.000.

Honkanen, Seppo; and Tervonen, Ari, to Oy Nokia AB. Method of producing optical waveguides by an ion exchange technique on a glass substrate. 5,160,523, Cl. 65-30.130.

Hoogendoorn, Abraham: *See*—
Druyvesteyn, Willem F.; Hoogendoorn, Abraham; Van De Kerkhof, Leon M.; and Veldhuis, Raymond N. J., 5,161,210, Cl. 395-2.000.

Hoopengardner, Merle R., to Step Loc Corporation. Carpet pads having pressure sensitive adhesive. 5,160,770, Cl. 428-40.000.

Hoover, Mervyn C.: *See*—
Alpers, Frederick C.; and Hoover, Mervyn C., 5,160,934, Cl. 342-351.000.

Hoover, Rocklin L. Surgical retractor. 5,159,921, Cl. 128-20.000.

Hoppe, Manfred; Wiegner, Dieter; Sagner, Klaus-Peter; Jordan, Heinz D.; and Brandt, Horst, to Bayer Aktiengesellschaft. Mixtures of blue azo disperse dyestuffs. 5,160,348, Cl. 8-639.000.

Hori, Masashi: *See*—
Muramoto, Tomotaka; Takahashi, Hirokazu; Horii, Hiroyuki; and Hori, Masashi, 5,161,070, Cl. 360-8.000.

Hori, Yoshikazu; Yamamoto, Hiroaki; and Sogawa, Fumihiro, to Matsushita Electric Industrial Co., Ltd. Optical pick-up using wavelength guide with grating coupler therein. 5,161,148, Cl. 369-112.000.

Horiba, Yasuhiro: *See*—
Nemoto, Yousui; Itoh, Akiyoshi; Kohmura, Toshimi; and Horiba, Yasuhiro, 5,160,783, Cl. 428-261.000.

Horii, Hiroyuki: *See*—
Muramoto, Tomotaka; Takahashi, Hirokazu; Horii, Hiroyuki; and Hori, Masashi, 5,161,070, Cl. 360-8.000.

Horiuchi, Korejiro, to Sanwa Koki Co., Ltd. Magnetically driven cyntrifical pump. 5,160,246, Cl. 417-365.000.

Horodysky, Andrew G., to Mobil Oil Corp. Multifunctional ester-type additives for liquid hydrocarbyl or hydrocarbyloxy fuel. 5,160,507, Cl. 44-390.000.

Horton, Dwayne; and Welborn, James C., Jr. Breech guide. 5,159,776, Cl. 43-24.000.

Horwitz, Susan: *See*—
Repe, Thomas; Horwitz, Susan; and Binkley, David, 5,161,216, Cl. 395-375.000.

Hoser, Jurgen, to Black & Decker, Inc. Power tool. 5,159,986, Cl. 173-48.000.

Hoshikawa, Hiroshi: *See*—
Nakamura, Eiichi; Tanaka, Hiroaki; Tanaka, Yoshiharu; Iitake, Takashi; and Hoshikawa, Hiroshi, 5,160,604, Cl. 210-85.000.

Hoshino, Hiroshi: *See*—
Ueyoko, Kiyoshi; and Hoshino, Hiroshi, 5,160,384, Cl. 152-454.000.

Hoshino, Isao: *See*—
Inoue, Akino; and Hoshino, Isao, 5,161,139, Cl. 369-44.230.

Hosoda, Hatsutoshi: *See*—
Kikuchi, Masatsune; Omori, Hiroshi; Hosoda, Hatsutoshi; and Kouda, Susumu, 5,160,376, Cl. 106-819.000.

Hosotani, Shiro; and Miki, Takahiro, to Mitsubishi Denki Kabushiki Kaisha. Reference voltage generating circuit, and A/D and D/A converters using the same. 5,160,930, Cl. 341-154.000.

Houldey, David: *See*—
Nelson, John L.; and Houldey, David, 5,160,515, Cl. 55-267.000.

Houston, Theodore W., to Texas Instruments Incorporated. Extended body contact for semiconductor over insulator transistor. 5,160,989, Cl. 257-347.000.

Howard, James R.; and Lucas, Gregory L., to Zycon Corporation. Capacitor laminate for use in capacitive printed circuit boards and methods of manufacture. 5,161,086, Cl. 361-321.000.

Howell, John R.: *See*—
Bell, Ronald D.; Gardiner, William C.; Howell, John R.; Matthews, Ronald D.; and Nichols, Steven P., 5,160,254, Cl. 431-7.000.

Hoya Corporation: *See*—
Sugihara, Osamu, 5,160,779, Cl. 428-209.000.

Hsiao, Mu-Yue: *See*—
Bossen, Douglas C.; Chen, Chin-Long; and Hsiao, Mu-Yue, 5,161,163, Cl. 371-54.000.

Hu, Cheney Y.: *See*—
Addink, Marvin; Hu, Cheney Y.; Leyba, Todd; Mullen, John J.; Till, Carolyn A.; and Holmes, Andrew W., 5,161,214, Cl. 395-145.000.

Huang, Philip M.: *See*—
Siomkos, John R.; and Huang, Philip M., 5,160,906, Cl. 333-204.000.

Hubert, Thomas G.; Stich, Frederick A.; Hazen, William J.; and Mills, Ricky, to Best Power Technology, Inc. Front panel unit for electronic equipment. 5,160,832, Cl. 235-145.00R.

Hubler, Frank J. Fifth wheel trailer hitch apparatus. 5,160,157, Cl. 280-423.100.

Hudson Products Corporation: *See*—
Victory, Sidney P., Jr., 5,159,974, Cl. 165-96.000.

Huete, David A.: *See*—
Lohr, Curtis J.; and Huete, David A., 5,159,891, Cl. 114-230.000.

Huff, G. David; and Rodkey, L. Scott, to University of Texas System, Board of Regents of the; and Ampholife Technologies, Inc. Apparatus and methods for isoelectric focusing of amphoteric substances incorporating ion selective membranes in electrode chambers. 5,160,594, Cl. 204-182.900.

Huff, James W., to Cadillac Rubber & Plastics, Inc. Overmolded gasket, heat exchanger tank incorporating the same and method for making the same. 5,160,474, Cl. 264-255.000.

Hughes Aircraft Company: *See*—
Chang, David B., 5,160,634, Cl. 210-748.000.
Christie, Nancy J.; and Schotter, Daniel K., 5,161,208, Cl. 385-128.000.
Pikulski, Joseph L., 5,161,207, Cl. 385-96.000.
Siddoway, Ronald T.; and Estrick, Vaughn H., 5,160,895, Cl. 330-151.000.
Smith, William A.; and Brodie, Eugene L., 5,161,092, Cl. 361-387.000.
Welkowsky, Murray S.; Vasudev, P. K.; Reif, Philip G.; and Goodwin, Norman W., 5,160,560, Cl. 156-154.000.
Whitney, Colin G.; and Cameron, Bruce A., 5,161,051, Cl. 359-351.000.

Hughes Tool Company: *See*—
Jurewicz, Stephen R., 5,159,857, Cl. 76-108.200.

Hugl, Herbert: *See*—
Hildenbrand, Karlheinz; Hugl, Herbert; and Dhein, Rolf, 5,160,436, Cl. 210-638.000.

Hugron, Denis P. Collapsible signalling post. 5,160,111, Cl. 248-548.000.

Hui, Titkwan, to Dallas Semiconductor Corporation. Delay circuit using primarily a transistor's parasitic capacitance. 5,160,863, Cl. 307-605.000.

Huis In't Veld, Marcel B. J.; Uhlhorn, Robert J. R.; Lin, Yve-Sheng; Keizer, Klaas; and Burggraaf, Anthonie J., to Aluminum Company of America. Porous inorganic composite semipermesable membrane and a method of preparation. 5,160,617, Cl. 210-490.000.

Hull, Michael: *See*—
Donker, Cornelis B.; Hull, Michael; and van de Pas, Johannes C., 5,160,655, Cl. 252-95.000.

Human Microprocessing, Inc.: *See*—
Montejo, Leopoldo S.; and Pean, Martine, 5,161,222, Cl. 395-500.000.

Humphrey, James C.: *See*—
Culver, John F.; Seymour, Douglas G.; and Humphrey, James C., 5,160,281, Cl. 439-692.000.

Hunt, Bobby R.: *See*—
Hutcheson, Timothy L.; Or, Wilson; Narayanan, Venkatesh; Mohan, Subramaniam; Wohlmut, Peter G.; Srinivasan, Ramanujam; Hunt, Bobby R.; and Ryan, Thomas W., 5,161,204, Cl. 382-16.000.

Hurlocker, Claude M.: *See*—
Czerwiec, Richard M.; Tyrrell, Raymond E.; Sanders, Gus C.; Sutherland, Joseph E.; Sanders, Richard J., Jr.; Hurlocker, Claude M.; Thorne, Hal A.; Runyon, V. Paul; and Aro, Enn, 5,161,152, Cl. 370-84.000.

Husain, Matt: *See*—
Gilles, Greg; and Husain, Matt, 5,160,636, Cl. 210-763.000.

Hut, Pieter K. H., to Metrias, B.V. Device for taking a sample of subcutaneous tissue cells from a body. 5,159,933, Cl. 128-753.000.

Hutcheson, Timothy L.; Or, Wilson; Narayanan, Venkatesh; Mohan, Subramaniam; Wohlmut, Peter G.; Srinivasan, Ramanujam; Hunt, Bobby R.; and Ryan, Thomas W., to Neuristics, Inc. Apparatus for generating a feature matrix based on normalized out-class and in-class variation matrices. 5,161,204, Cl. 382-16.000.

Hutchin, Richard A., to United States of America, Air Force. Large field of view light beam transceiver having small motion of optics. 5,161,045, Cl. 359-197.000.

Hutchinson Technology, Inc.: *See*—
Bennin, Jeffry S.; and Dustrude, Mark O., 5,160,823, Cl. 219-121.680.

Huynh, Hoa T.: *See*—
Jao, Frank; Wong, Patrick S.; Huynh, Hoa T.; McChesney, Kathy; and Wat, Pamela K., 5,160,744, Cl. 424-473.000.

Hwang, Shie-Ming: *See*—
Mazer, Terrence B.; Meyer, Glenn A.; Hwang, Shie-Ming; Candler, Edrick L., Jr.; Drayer, Lonnie R.; and Daab-Krzykowski, Andre, 5,160,742, Cl. 424-469.000.

Hwang, Shyshung S., to Xerox Corporation. Image registration system. 5,160,946, Cl. 346-157.000.

Hyde, Glenn F.; and Ulrich, Robert R., to United Container Machinery Group, Inc. Method of hardening corrugating rolls. 5,160,556, Cl. 148-525.000.

Hyde, Robert W.: *See*—
Corp, Douglas M.; Hyde, Robert W.; Brooks, Frank W., Sr.; Holliday, Gary G.; and Fanelli, Michael W., 5,159,998, Cl. 188-340.000.

Hydro Systems Company: *See*—
Sand, William F., 5,159,958, Cl. 137-888.000.

Hydroacoustics, Inc.: *See*—
Snyder, Edward A., 5,160,393, Cl. 156-73.500.

Hynes, Joseph H., to Cooper Industries, Inc. Double walled riser. 5,159,982, Cl. 166-345.000.

Hyoi, Isao, to Murai Co., Ltd. Eyeglass frame with flanged bridge of NT alloy. 5,160,947, Cl. 351-124.000.

H_2O Chemists, Inc.: *See*—
Stillman, Neil W., 5,160,488, Cl. 435-262.500.

I. Kruger, Inc.: *See*—
Kos, Peter, 5,160,043, Cl. 210-605.000.

Iampietro, Robert L.: *See*—
Garg, Diwakar; Tsai, Wilman; Iampietro, Robert L.; Kimock, Fred M.; and Kelly, C. Michael, 5,160,544, Cl. 118-724.000.

Ianna, Joseph T.; and Deshong, John C., to Play Action Inc. Single use radio device and method for using the same. 5,161,250, Cl. 455-66.000.

Ibuchi, Yoshiaki; and Tamagaki, Akira, to Sharp Kabushiki Kaisha. Method of transporting a photosensitive sheet. 5,160,960, Cl. 355-27.000.

Ichikawa, Haruo; Iida, Sanpei; and Takahashi, Koichi, to Fuji Photo Film Co., Ltd. Film cartridge producing method. 5,159,747, Cl. 29-512.000.

Ichimura, Hiroshi; Minema, Ikumi; and Katase, Wataru, to Victor Company of Japan, Ltd. dc-dc Converter for video apparatus. 5,161,022, Cl. 358-190.000.

ICI Australia Operations Proprietary Limited: *See*—
Sujansky, Vladimir, 5,160,387, Cl. 149-2.000.

Ide, Hiroshi: *See*—
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, 5,160,546, Cl. 127-60.000.

Igarashi, Sadato: *See*—
Niinai, Yoshitaka; Sagawa, Norihisa; Kawai, Yasuhiro; Igarashi, Sadato; and Ohyama, Hisanobu, 5,160,876, Cl. 318-460.000.

Igashira, Toshihiko: *See*—
Saito, Kimitaka; Matsumoto, Tatsuyoshi; and Igashira, Toshihiko, 5,159,915, Cl. 123-557.000.

Iguchi, Masashi: *See*—
Ikegami, Tatsuji; Ohbayashi, Tetsuro; Yoshida, Keiichi; and Iguchi, Masashi, 5,160,250, Cl. 415-90.000.

Ihara, Yuji; and Tanioka, Hiroshi, to Nikon Corporation. Compound aspherical lens. 5,161,061, Cl. 359-708.000.

Iida, Sanpei: *See*—
Ichikawa, Haruo; Iida, Sanpei; and Takahashi, Koichi, 5,159,747, Cl. 29-512.000.

Iijima, Yasuo, to Kabushiki Kaisha Toshiba. Processing system which transmits a predetermined error code upon detection of an incorrect transmission code. 5,161,231, Cl. 395-800.000.

Iijima, Yasuo, to Kabushiki Kaisha Toshiba. Method and system for allocating file area in memory area of IC card. 5,161,256, Cl. 902-26.000.

Iimura, Shinichiro: *See*—
Ogawa, Hiroshi; and Iimura, Shinichiro, 5,161,145, Cl. 369-59.000.

Iitake, Takashi: *See*—
Nakamura, Eiichi; Tanaka, Hiroaki; Tanaka, Yoshiharu; Iitake, Takashi; and Hoshikawa, Hiroshi, 5,160,604, Cl. 210-85.000.

Ijyuin, Makoto; Tsuda, Akihiko; and Nawata, Shinichi, to Tsutsunaka Plastic Kogyo Kabushiki Kaisha. Method for producing a resin pipe for use as the inner lining of existing pipes. 5,160,476, Cl. 264-563.000.

Ikeda, Kenichi: *See*—
Yamaguchi, Tomoo; and Ikeda, Kenichi, 5,160,619, Cl. 210-500.380.

Ikeda, Mitsuo: *See*—
Etou, Ryoukichi; Hashizume, Kinji; Ikeda, Mitsuo; and Asada, Hideo, 5,159,818, Cl. 62-137.000.

Ikeda, Osamu, to Dia Semicon Systems Incorporated. Electric power unit. 5,161,097, Cl. 363-124.000.

Ikegami, Tatsuji; Ohbayashi, Tetsuro; Yoshida, Keiichi; and Iguchi, Masashi, to Osaka Vacuum, Ltd. Vacuum pump with a peripheral groove pump unit. 5,160,250, Cl. 415-90.000.

Ikejima, Shoichi: *See*—
Hasegawa, Takanori; and Ikejima, Shoichi, 5,160,564, Cl. 156-231.000.

Illinois Tool Works, Inc.: *See*—
Binsteld, Michael A., 5,160,030, Cl. 206-497.000.

Imai, Hiroshi: *See*—
Nagasaki, Yoshimi; Hashimoto, Takao; Takemura, Isao; Imai, Hiroshi; Hirama, Yasunobu; and Nakajima, Tadayoshi, 5,160,621, Cl. 210-614.000.

Imaje S.A.: *See*—
Bajeux, Paul; and Dunand, Alain, 5,160,939, Cl. 346-75.000.

Imamaki, Teruo: *See*—
Takagi, Yukihito; Imamaki, Teruo; Nakata, Shigeru; and Sakuma, Mikio, 5,160,573, Cl. 156-510.000.

Imamura, Minoru: *See*—
Takahashi, Mineo; Nakayama, Susumu; Suzuki, Satoshi; Mori, Akio; Seo, Hiroyuki; Imamura, Minoru; Tanaka, Hiroshi; and Yoneyama, Norihiro, 5,160,812, Cl. 174-135.000.

Imokawa, Naoki: *See*—
Chaya, Masahiko; and Imokawa, Naoki, 5,161,146, Cl. 369-72.000.

Imperial Chemical Industries PLC: *See*—
Anthony, Vivienne; Clough, John M.; deFraine, Paul; Godfrey, Christopher; and Beautement, Kevin, 5,160,364, Cl. 71-92.000.
Edwards, Derek W., 5,160,499, Cl. 570-179.000.
Gregory, Peter; and Quayle, Arthur, 5,160,171, Cl. 283-91.000.
Scher, Herbert B.; and Rodson, Marius, 5,160,529, Cl. 71-118.000.

Imus, Mark H., to Optical Coating Laboratory, Inc. Method for forming optical elements having an optical coating by replication of a mold. 5,160,668, Cl. 264-1.700.

Ina, Hideki; Kosugi, Masao; and Suzuki, Akiyoshi, to Canon Kabushiki Kaisha. Alignment and exposure apparatus. 5,160,957, Cl. 355-43.000.

INAMED Development Co.: *See*—
Vincent, Vernon L., 5,160,338, Cl. 606-157.000.

Inamiya, Kenichi, to Mitsubishi Denki Kabushiki Kaisha. Positioning method utilizing artificial satellites in geosynchronous altitude orbits. 5,160,935, Cl. 342-357.000.

Inco Alloys International, Inc.: *See*—
Smith, Gaylord D.; Wendler, Walter H.; and O'Donnell, David B., 5,160,382, Cl. 148-327.000.

Incom America, Inc. A Corp. of Texas: *See*—
Marceau, Stephen M., 5,160,001, Cl. 190-102.000.

Indiana Mills and Manufacturing Inc.: *See*—
Lee, David J., 5,160,186, Cl. 297-479.000.

Indiana Tube Corporation: *See*—
Virtue, Michael D., 5,159,976, Cl. 165-144.000.

Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nabo, Olle, to Alfa-Laval Separation AB. Centrifugal separator having a device for the transformation of kinetic energy to pressure energy. 5,160,311, Cl. 494-56.000.

Ingersoll-Rand Company: *See*—
Nolte, Paul A., 5,160,054, Cl. 220-374.000.

Ingold, Alain F. C. Device for adjusting the angular setting of a driven shaft relative to a driving shaft. 5,159,904, Cl. 123-90.150.

Inman, Larry; and Koskela, Mike, to Ag-Bag Corporation. Rotor arrangement for a bagging machine. 5,159,877, Cl. 100-144.000.

Inomata, Masayuki: *See*—
Harada, Takashi; Hatakeyama, Ken-ichi; Masuda, Norio; Fujihara, Noboru; and Inomata, Masayuki, 5,160,806, Cl. 174-35.0GC.

Inoue, Akino; and Hoshino, Isao, to Kabushiki Kaisha Toshiba. Focusing error detecting apparatus. 5,161,139, Cl. 369-44.230.

Inoue, Akira: *See*—
Nakajima, Yasuharu; and Inoue, Akira, 5,160,907, Cl. 333-246.000.

Inoue, Hiroshi; Hara, Takehiko; and Hidano, Kengo, to Nippon Thompson Co., Ltd. Machine for testing centrifugal load of bearing. 5,159,830, Cl. 73-118.100.

Inoue, Katsuhiro: *See*—
Teshima, Fumiaki; Inoue, Katsuhiro; Kurebayashi, Kaoru; Mihara, Yukihiro; and Kishimoto, Takuya, 5,161,115, Cl. 364-551.010.

Inoue, Tetsuhi: *See*—
Namba, Kenryo; Shinkai, Masahiro; Tezuka, Sinichi; Inoue, Tetsuhi; Aoi, Toshiki; and Takayama, Suguru, 5,161,150, Cl. 369-275.400.
Inoue, Toshinori: *See*—
Yoshida, Tsutomu; Inoue, Toshinori; Shirasawa, Toshihiko; and Asahina, Takashi, 5,160,479, Cl. 266-233.000.
Institut Francais du Petrole: *See*—
Alagy, Jacques; Broutin, Paul; Busson, Christian; and Weill, Jerome, 5,160,501, Cl. 585-500.000.
Juguin, Bernard A.; Boitiaux, Jean-Paul; and Martino, Germain J., 5,160,497, Cl. 568-798.000.
Intelmatec Corporation: *See*—
Lykam, Mark A.; and Akagawa, Minoru, 5,160,181, Cl. 294-64.100.
International Business Machines Corporation: *See*—
Abraham, Robert L., 5,161,223, Cl. 395-600.000.
Abraham, Robert L.; and Priven, Michael P., 5,161,225, Cl. 395-600.000.
Addink, Marvin; Hu, Cheney Y.; Leyba, Todd; Mullen, John J.; Till, Carolyn A.; and Holmes, Andrew W., 5,161,214, Cl. 395-145.000.
Baum, Richard I.; Brotman, Charles H.; and Rymarczyk, James W., 5,161,156, Cl. 371-7.000.
Bossen, Douglas C.; Chen, Chin-Long; and Hsiao, Mu-Yue, 5,161,163, Cl. 371-54.000.
Chu, Richard C.; Ellsworth, Michael J., Jr.; Goth, Gary F.; Simons, Robert E.; and Zumbrunnen, Michael L., 5,161,089, Cl. 361-385.000.
Dias, Daniel M.; Iyer, Balakrishna R.; and Yu, Philip S., 5,161,227, Cl. 395-650.000.
Dolev, Danny; and Dwork, Cynthia, 5,161,186, Cl. 380-2.000.
Frankeny, Jerome A.; Frankeny, Richard F.; Hermann, Karl; and Wustrau, Rolf, 5,161,087, Cl. 361-382.000.
Harris, Richard H., 5,160,920, Cl. 340-765.000.
Levenson, Marc D., 5,161,133, Cl. 369-13.000.
Nicholson, James O.; O'Quin, John C., III; O'Quin, John T., II; and Strietelmeier, Frederick E., 5,161,219, Cl. 395-425.000.
Pricer, Wilber D.; Faure, Thomas B.; Meyerson, Bernard S.; Nestork, William J.; and Turnbull, John R., Jr., 5,160,987, Cl. 257-307.000.
International Paper Company: *See*—
Beales, Jonathan T., 5,160,081, Cl. 229-114.000.
Inumochi, Mitsuo; Matsuura, Tsukasa; Yura, Shinsuke; and Kumagai, Munehito, to Mitsubishi Denki Kabushiki Kaisha. Magnetic head slider suspension apparatus and method of fabrication. 5,161,076, Cl. 360-104.000.
Iowa State University Research Foundation, Inc.: *See*—
Wechsler, Monroe S.; and Carey, Scott T., 5,160,917, Cl. 340-686.000.
Irinatsu, Yuuichi: *See*—
Nomura, Masaki; Koike, Shin; Yamashita, Ko; Okisaka, Koichi; Sano, Yoshito; Omura, Hisao; Irinatsu, Yuuichi; Masui, Kenji; and Yasumasu, Takeshi, 5,160,759, Cl. 426-602.000.
IRIS Graphics, Inc.: *See*—
Fargo, Foster M.; Geiselman, Ted S.; and Jones, Alan H., 5,160,938, Cl. 346-1.100.
IRO AB: *See*—
Josefsson, Par; and Bengtsson, Alf, 5,160,097, Cl. 242-47.010.
Irwin, Bruce C.: *See*—
O'Hara, John; Fuhrman, Fred L.; Wolfe, David R.; and Irwin, Bruce C., 5,160,259, Cl. 432-37.000.
Isco, Inc.: *See*—
Clay, Dale L.; Allington, Robert W.; Jameson, Daniel G.; and Winter, Robin R., 5,160,624, Cl. 210-634.000.
Ishibashi, Kenzo: *See*—
Ishida, Takashi; O'Hara, Shunji; Ishibashi, Kenzo; and Satoh, Toshio, 5,161,243, Cl. 369-44.250.
Ishida, Takashi; O'Hara, Shunji; Ishibashi, Kenzo; and Satoh, Toshio, to Matsushita Electric Industrial Co., Ltd. Tracking system for an optical recording/reproducing apparatus having a plurality of light spots. 5,161,243, Cl. 369-44.250.
Ishiguro, Hiroyuki: *See*—
Sawada, Toshiki; Yamano, Masaru; Kazuo, Taguchi; Kojima, Takao; Ishiguro, Hiroyuki; and Yamada, Masahiko, 5,160,598, Cl. 204-429.000.
Ishihara, Shunichi; Hirooka, Masaaki; Hanna, Jun-Ichi; and Shimizu, Isamu, to Canon Kabushiki Kaisha. Device for forming a deposited film. 5,160,543, Cl. 118-715.000.
Ishihara, Toshinobu: *See*—
Mihira, Hiroshi; Shimizu, Tetsuo; Hirahara, Kazuhiro; Ishihara, Toshinobu; and Takaya, Seiki, 5,160,542, Cl. 118-715.000.
Ishii, Kanji; and Nagai, Atsushi, to Hochiki Kabushiki Kaisha. Ionization type smoke sensor. 5,160,916, Cl. 340-629.000.
Ishii, Kazuhide: *See*—
Yukumoto, Masao; Ozawa, Michiharu; Ishii, Kazuhide; and Shimizu, Hiroshi, 5,160,390, Cl. 148-325.000.
Ishii, Kenzi: *See*—
Gaku, Morio; Ishii, Kenzi; and Nakai, Takamasa, 5,160,787, Cl. 428-333.000.
Ishii, Yoshibumi: *See*—
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, 5,160,546, Cl. 127-60.000.
Ishikawa, Hideaki; Sugiyama, Yoshihiro; Muto, Shunichi; and Fujii, Toshio, to Fujitsu Limited. High speed optosemiconductor device having multiple quantum wells. 5,160,993, Cl. 257-14.000.
Ishikawa, Hiroko: *See*—
Morishita, Yoshii; Sugimoto, Yasushi; Hayashida, Shigeru; Ishikawa, Hiroko; Noda, Yoshiaki; Murakami, Shigeru; Sato, Munehiro; Saito, Yoshinori; Kurata, Naoji; and Sugita, Yoshio, 5,160,487, Cl. 430-59.000.
Ishikawa, Katsuya: *See*—
Kodama, Kenzaburo; Kamei, Kenji; Yoshida, Kousuke; Ishikawa, Katsuya; Kubo, Yukio; and Takatani, Yoshiaki, 5,160,708, Cl. 422-171.000.
Ishikawa, Masayuki; Taguchi, Tadashi; and Tsuchihashi, Yasuhiko, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Compressed powder magnetic core and method for fabricating same. 5,160,447, Cl. 252-62.540.
Ishikawa, Yasuki: *See*—
Shiraishi, Yasuhiro; and Ishikawa, Yasuki, 5,161,106, Cl. 364-424.050.
Ishizawa, Katsunobu: *See*—
Totsuka, Nobuo; Kimura, Mitsuo; Kurisu, Takao; Mishiro, Yuji; Sengan, Masakazu; Ishizawa, Katsunobu; Kashihara, Shigemitsu; Kanazawa, Minoru; and Komatu, Nagahiro, 5,160,590, Cl. 204-141.500.
Isogai, Mitsuru, to Minolta Camera Kabushiki Kaisha. Controllable fixing device for fixing a toner image into a sheet. 5,160,970, Cl. 355-284.000.
Isogawa, Atsushi, to Sanshin Kogyo Kabushiki Kaisha. Ignition timing control member supporting structure of outboard motor. 5,159,916, Cl. 123-602.000.
Isosu, Toru: *See*—
Shiina, Yoshio; Kato, Akihiko; Isosu, Toru; Kanno, Makoto; and Sato, Akihiko, 5,160,966, Cl. 355-206.000.
ISP Investments Inc.: *See*—
Chaudhuri, Ratan K.; Narayanan, Kolazi S.; and Dahanayake, Manilal, 5,160,528, Cl. 71-79.000.
Login, Robert; Bires, Carmen D.; and Walls, Edward W., Jr., 5,160,729, Cl. 424-47.000.
Isshiki, Kunihiko: *See*—
Shima, Akihiro; and Isshiki, Kunihiko, 5,161,166, Cl. 372-45.000.
Isuzu Motors Limited: *See*—
Koshizawa, Toshifumi, 5,160,971, Cl. 356-5.000.
Itami, Tadashi: *See*—
Tukiyama, Yasutaka; Itami, Tadashi; Okada, Yosuhiro; and Hamamoto, Syougo, 5,160,873, Cl. 318-254.000.
ITD Corporation: *See*—
Rabinowitz, Israel N., 5,160,756, Cl. 426-431.000.
Ito, Keiichi: *See*—
Odawara, Shiro; Ito, Keiichi; and Kobayashi, Kazushi, 5,160,040, Cl. 210-167.000.
Ito, Kengo, to Sony Corporation. Display composition, coloring pigment, and recording material. 5,160,371, Cl. 106-19.00R.
Ito, Koichi; Higashihara, Akihito; and Sugi, Hikaru, to Nippondenso Co., Ltd. Device for operating a damper in an air conditioning system for a vehicle. 5,160,115, Cl. 251-129.120.
Ito, Masaru: *See*—
Saito, Atsushi; Ojima, Masahiro; and Ito, Masaru, 5,161,135, Cl. 369-13.000.
Ito, Seiga: *See*—
Yasumura, Shigeyoshi; Nishi, Tatsunari; and Ito, Seiga, 5,160,735, Cl. 424-94.630.
Ito, Takeshi: *See*—
Suenaga, Hiroyoshi; Ito, Takeshi; Takagi, Masakuni; Takeuchi, Hiroyoshi; Fukui, Hideaki; and Minakawa, Kuninori, 5,159,787, Cl. 51-326.000.
Itoh, Akiyoshi: *See*—
Nemoto, Yousui; Itoh, Akiyoshi; Kohmura, Toshimi; and Horiba, Yasuhiro, 5,160,783, Cl. 428-261.000.
Itoh, Junichi; and Kurita, Kazuyuki, to Fujitsu Limited. Semiconductor device and method of manufacturing the same. 5,160,998, Cl. 257-760.000.
Iurato, Joy R.: *See*—
Gunnerson, Fred S.; Sanderlin, F. Dave; Iurato, Joy R.; and Padilla, Antonio A., 5,159,972, Cl. 165-32.000.
Ivanov, Andrei A.: *See*—
Spitsin, Valentin M.; Karetnikov, Evgeny V.; Grishin, Sergei F.; Ivanov, Andrei A.; and Gorberg, Boris L., 5,160,592, Cl. 204-164.000.
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Spitsin, Valentin M.; Karetnikov, Evgeny V.; Grishin, Sergei F.; Ivanov, Andrei A.; and Gorberg, Boris L., 5,160,592, Cl. 204-164.000.
Iveco Fiat S.p.A.: *See*—
Pigozzi, Gian M., 5,161,174, Cl. 377-28.000.
Saggese, Luigi, 5,159,746, Cl. 29-467.000.
Iwabuchi, Toshiaki, to Kabushiki Kaisha COM. Direct sealing coupling. 5,160,178, Cl. 285-328.000.
Iwai, Shingo; and Yoshioka, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Circumferential flow type fuel pump. 5,160,249, Cl. 415-55.300.
Iwaki, Norio: *See*—
Hayashi, Toshihiro; Takeda, Satoru; Yamazaki, Shyoichiro; Sugie, Masayuki; and Iwaki, Norio, 5,160,754, Cl. 426-94.000.
Iwamoto, Kazunori: *See*—
Marumo, Mitsuji; Iwamoto, Kazunori; Mizusawa, Nobutoshi; Kariya, Takao; and Uzawa, Shunichi, 5,160,961, Cl. 355-53.000.

Iwamoto, Tatsuhiko: *See*—
Futami, Takashi; Iwamoto, Tatsuhiko; and Okamura, Seijiro, 5,160,772, Cl. 428-71.000.

Iwamoto, Tetsushi; Yoshida, Yasunobu; Furuto, Toshiaki; and Sudo, Koichi, to Tosoh Corporation. Sputtering target for producing electroconductive transparent films and process for manufacture thereof. 5,160,675, Cl. 264-56.000.

Iwanaga, Masaharu: *See*—
Kouda, Katsuya; and Iwanaga, Masaharu, 5,161,215, Cl. 395-250.000.

Iwao, Akira: *See*—
Sunagawa, Masao; and Iwao, Akira, 5,159,738, Cl. 15-326.000.

Iwashita, Tomonori; Egawa, Akira; and Sugiyama, Yoshiaki, to Canon Kabushiki Kaisha. Print control apparatus. 5,160,952, Cl. 354-76.000.

Iwashita, Tomonori; and Tsujimoto, Sinichi, to Canon Kabushiki Kaisha. Camera system. 5,160,953, Cl. 354-173.100.

Iwazaki, Kuniyasu: *See*—
Hishida, Noriaki; and Iwazaki, Kuniyasu, 5,160,866, Cl. 310-90.000.

Iyer, Balakrishna R.: *See*—
Dias, Daniel M.; Iyer, Balakrishna R.; and Yu, Philip S., 5,161,227, Cl. 395-650.000.

Iyoda, Hiroumi; Saito, Chuichi; Shiina, Mamoru; and Fujii, Yoshitaka, to Hitachi, Ltd.; and Hitachi Cable, Ltd. Passenger conveyor and moving handrail for passenger conveyor and manufacturing method therefor. 5,160,009, Cl. 198-337.000.

Izbicki, Kenneth J.: *See*—
Lemay, Richard A.; Tague, Steven A.; Izbicki, Kenneth J.; and Woods, William E., 5,161,217, Cl. 395-375.000.

Jabbari, Iraj, to Seagate Technology, Inc. Actuator arm with a steel sleeve for thermal off track compensation. 5,161,077, Cl. 360-106.000.

Jachowicz, Janusz: *See*—
Berthiaume, Marianne; and Jachowicz, Janusz, 5,160,733, Cl. 424-71.000.

Jackel, Johann: *See*—
Reik, Wolfgang; and Jackel, Johann, 5,160,007, Cl. 192-70.170.

Jacobs, Russell H.: *See*—
Gami, Bipin V.; and Jacobs, Russell H., 5,161,073, Cl. 360-73.030.

Jaffe, James: *See*—
Owen, William H.; Caywood, John; Drori, Joseph; Jaffe, James; Nojima, Isao; Sung, Jeffrey; and Wang, Ping, 5,161,157, Cl. 371-10.200.

Jaillet, Bernard; and Berthier, Jean-Marc, to Hexcel-Genin. Thermoplastic fabric. 5,160,485, Cl. 428-116.000.

Jakobsson, Gunnar S., to Berema Aktiebolag. Pneumatic impulse motor with gas cushion. 5,159,814, Cl. 60-542.000.

James River II, Inc.: *See*—
Thomas, John S., Jr., 5,160,391, Cl. 156-69.000.

Jameson, Daniel G.: *See*—
Clay, Dale L.; Allington, Robert W.; Jameson, Daniel G.; and Winter, Robin R., 5,160,624, Cl. 210-634.000.

Janich, Hans-Jurgen, to Mannesmann Aktiengsellshaft. Hinged safety-valve for large ducts. 5,159,954, Cl. 137-557.000.

Jao, Frank; Wong, Patrick S.; Huynh, Hoa T.; McChesney, Kathy; and Wat, Pamela K., to Alza Corporation. Verapmil therapy. 5,160,744, Cl. 424-473.000.

Japan Electronic Control Systems Co., Ltd.: *See*—
Furuya, Junichi, 5,159,913, Cl. 123-493.000.

Japan Sewage Works Agency: *See*—
Taniguchi, Naohiro; Koike, Syuzo; Watanabe, Yasuhiko; Takeuchi, Tadao; and Fujiwara, Noboru, 5,160,041, Cl. 210-205.000.

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Wagenknecht, Marcel H., 5,160,335, Cl. 606-59.000.

Jaskowiak, Timothy R.: *See*—
Fromm, Paul M.; and Jaskowiak, Timothy R., 5,160,130, Cl. 271-307.000.

Jean-Pierre, Conil; and Pierrot, Henri, to Telemecanique. Remote control system, particularly for lighting, in premises incorporating controllable distribution zones with variable conformations. 5,160,924, Cl. 340-825.520.

Jenkins, Bobby L. Transmission utility stand. 5,160,125, Cl. 269-50.000.

Jennings, Alfred R., Jr., to Mobil Oil Corporation. Method for limiting downward growth of induced hydraulic fractures. 5,159,979, Cl. 166-280.000.

Jensen, John S. Ground surfacing and erosion control device. 5,160,215, Cl. 404-46.000.

Jensen, Joseph C.; and Taylor, Junius E., to Engineering & Research Associates, Inc. Low thermal inertia heater. 5,160,396, Cl. 156-304.200.

Jentsch, Dieter: *See*—
Rein, Rudiger; Jentsch, Dieter; and Wittel, Kalus-Werner, 5,160,551, Cl. 148-254.000.

Jestadt, Albrecht; Schafer, Gerhard; and Wolf, Jurgen, to Braun Aktiengesellschaft. Hinged frames for a dry shaving apparatus. 5,159,755, Cl. 30-43.920.

Jinbo, Shunji: *See*—
Yoshida, Hiroshi; Shibazaki, Mitsuhiro; Kubo, Hiroaki; and Jinbo, Shunji, 5,160,220, Cl. 405-236.000.

JLG Industries, Inc.: *See*—
Gray, Gregory G., 5,160,055, Cl. 212-150.000.

JMI Software Consultants Inc.: *See*—
Wainer, Susan E., 5,161,226, Cl. 395-650.000.

Joerns Healthcare Inc.: *See*—
Peterson, Warren J., 5,160,010, Cl. 5-613.000.

Johan Seisakusho Co., Ltd.: *See*—
Naoi, Yasushi; Kobayashi, Kenichi; Ota, Harutoshi; and Kuribayashi, Yasushi, 5,159,850, Cl. 74-523.000.

Johansson, Ingemar; and Svedman, Kjell, to Danes Verkstader AB. Method for producing of concrete with controllable density. 5,160,540, Cl. 106-672.000.

John H. Blanz Company, Inc.: *See*—
Blanz, John H., 5,160,883, Cl. 324-158.00F.

Johns Hopkins University, The: *See*—
Gilbert, Paul H.; Niemann, Ronald G.; and Trapp, Robert L., 5,161,170, Cl. 375-98.000.
Potember, Richard S.; Yamaguchi, Shoji; and Viands, Carla A., 5,161,149, Cl. 369-126.000.

Johnson, David A., to Mid-Valley Helicopters, Inc. Infrared fire-perimeter mapping. 5,160,842, Cl. 250-338.100.

Johnson, Jesse D. Seed germinating device and method of use. 5,159,779, Cl. 47-61.000.

Johnson, Ken C. Electric wall switch with ground fault protection. 5,161,240, Cl. 361-42.000.

Johnson, Kenneth C. Dispersion-compensated fresnel lens. 5,161,057, Cl. 359-566.000.

Johnson, Larry D., to Miles Inc. Reagent strip calibration system. 5,160,278, Cl. 439-593.000.

Johnson, Marshall L.: *See*—
Whitt, Riley S.; Bridges, William L.; and Johnson, Marshall L., 5,159,734, Cl. 15-883.000.

Johnson Matthey, Inc.: *See*—
Hochella, William A.; and Heffernen, Steven A., 5,160,722, Cl. 423-403.000.

Johnson, Richard G.: *See*—
Bosworth, Mark E.; Dunn, Thomas J.; Hall, Warren E.; Johnson, Richard G.; Kneller, Mills T.; Lin, Youlin; Wallace, Rebecca A.; White, David H.; and Wong, David M., 5,160,437, Cl. 210-651.000.

Johnson, Terry R.: *See*—
Pierce, R. Dean; Ackerman, John P.; Battles, James E.; Johnson, Terry R.; and Miller, William E., 5,160,367, Cl. 75-397.000.

Johnston, Daniel J.; and Cleven, Russell, to Automated Storage & Retrieval Systems of America. Automatic locking device for movable shelving. 5,160,189, Cl. 312-201.000.

Jones, Alan H.: *See*—
Fargo, Foster M.; Geiselman, Ted S.; and Jones, Alan H., 5,160,938, Cl. 346-1.100.

Jones, Curtis R., Jr.: *See*—
Griffin, Michael R.; George, Daryl D.; and Jones, Curtis R., Jr., 5,161,102, Cl. 395-800.000.

Jones, David S.: *See*—
Chapman, John R.; and Jones, David S., 5,160,841, Cl. 250-288.000.

Jones, Ronald D.; and Cross, Joseph B., to Phillips Petroleum Company. Separating of fibers from a fiber-containing solid sample. 5,160,578, Cl. 156-655.000.

Jones, Thomas R.: *See*—
Knudson, Milburn I., Jr.; and Jones, Thomas R., 5,160,454, Cl. 252-315.200.

Jonke, Hans. Crane system with continual conveyor system for moving discrete items of freight. 5,160,012, Cl. 198-369.000.

Jonsson, Jan A.; and Carlshaf, Alf, to Pharmacia LKB Biotechnology AB. Method for flow field flow fractionation. 5,160,625, Cl. 210-635.000.

Jordan, Heinz D.: *See*—
Hoppe, Manfred; Wiegner, Dieter; Sagner, Klaus-Peter; Jordan, Heinz D.; and Brandt, Horst, 5,160,348, Cl. 8-639.000.

Josefsson, Par; and Bengtsson, Alf, to IRO AB. Yarn storage and feed device. 5,160,097, Cl. 242-47.010.

Josephson, Lee; Groman, Ernest V.; and Palmacci, Stephen, to Advanced Magnetics Inc. Filter sterilization for production of colloidal, superparamagnetic MR contrast agents. 5,160,726, Cl. 424-9.000.

Joshi, Shankar R.: *See*—
Rohde, Meta; and Joshi, Shankar R., 5,160,810, Cl. 174-52.400.

Jourdan-LaForte, Eric: *See*—
Carron, Henry; and Jourdan-LaForte, Eric, 5,160,656, Cl. 252-99.000.

Jowang, Fu, to Tamarack Telecom Inc. Curvilinear motion type optical filter driving mechanism. 5,161,069, Cl. 359-889.000.

Juan, Hsuan-Chun. Hair style album. 5,160,169, Cl. 281-15.100.

Juenger, Jerome A.: *See*—
Herzner, Fredrick C.; Juenger, Jerome A.; and Wayte, Peter, 5,160,243, Cl. 416-220.00R.

Juguin, Bernard A.; Boitiaux, Jean-Paul; and Martino, Germain J., to Institut Francais du Petrole. Phenol production process. 5,160,497, Cl. 568-798.000.

Juhas, William M. Modular structural roofing and wall system. 5,159,791, Cl. 52-90.000.

Julius Blum Gesellschaft m.b.H.: *See*—
Brustle, Klaus; Tofferl, Andreas; and Rock, Erich, 5,159,740, Cl. 16-258.000.

Jurewicz, Stephen R., to Hughes Tool Company. Fixed cutter bit with improved diamond filled compacts. 5,159,857, Cl. 76-108.200.

Jurga, Stanley M.; and Chen, Mike, to Ampac Enterprises, Inc. Shoulder pad with readily removable padding. 5,159,715, Cl. 2-2.000.

Justin, Anthony J.: *See*—
Gasser, William J.; Carco, Timothy J.; and Justin, Anthony J., 5,160,430, Cl. 210-138.000.

Kabat, Daniel M.: *See*—
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Kabelmetal Electro GmbH: *See*—
Keim, Norbert; and Wittmann, Manfred, 5,160,520, Cl. 65-2.000.

Kaburaki, Masahiko, to Tohgun Kigyo Co., Ltd. Diving helmet. 5,159,923, Cl. 128-201.270.
Kabushiki Kaisha COM: *See*—
Iwabuchi, Toshiaki, 5,160,178, Cl. 285-328.000.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Miyauchi, Shigeaki; Miyata, Koichi; Kumagai, Kazuo; and Kobashi, Koji, 5,160,405, Cl. 156-643.000.
Yoshimatsu, Hideaki; and Fukushima, Koichi, 5,159,813, Cl. 60-459.000.
Yoshimatsu, Hideaki; Hayashi, Norihiko; and Kinugawa, Hideki, 5,160,056, Cl. 212-155.000.
Kabushiki Kaisha Kosmek: *See*—
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Kabushiki Kaisha Sankyo Seiki Seisakusho: *See*—
Ishikawa, Masayuki; Taguchi, Tadashi; and Tsuchihashi, Yasuhiko, 5,160,447, Cl. 252-62.540.
Kanai, Takashi; Miyazaki, Kunio; and Tsuzuku, Masayuki, 5,161,075, Cl. 360-99.040.
Kabushiki Kaisha Toshiba: *See*—
Fukuda, Norisuke; and Murakami, Koji, 5,159,823, Cl. 68-12.210.
Higuchi, Takayoshi; and Sugiura, Souichi, 5,160,988, Cl. 257-301.000.
Honda, Michitaka; and Nakatani, Yoshinori, 5,161,178, Cl. 378-99.000.
Iijima, Yasuo, 5,161,231, Cl. 395-800.000.
Iijima, Yasuo, 5,161,256, Cl. 902-26.000.
Inoue, Akino; and Hoshino, Isao, 5,161,139, Cl. 369-44.230.
Kaga, Yasuhiro; Hattori, Kei; Hasegawa, Isahiro; and Komatsu, Fumio, 5,161,201, Cl. 382-8.000.
Kataoka, Shigeru; and Shimizu, Shoichi, 5,160,858, Cl. 307-450.000.
Kiwata, Norio; and Takuma, Masaaki, 5,161,028, Cl. 358-254.000.
Kimura, Junko; and Tanaka, Shigeo, 5,161,031, Cl. 358-310.000.
Kono, Mitsunobu, 5,160,875, Cl. 318-280.000.
Mannichi, Toshihiko; and Yamamoto, Toshifumi, 5,161,036, Cl. 358-466.000.
Morihara, Kazushige; Kimura, Masashi; and Yamauchi, Shin, 5,161,084, Cl. 361-225.000.
Takeuchi, Ryoji; Yoshimaru, Tomohisa; and Doi, Akihiko, 5,161,144, Cl. 369-54.000.
Teshima, Fumiaki; Inoue, Katsuhiro; Kurebayashi, Kaoru; Mihara, Yukihiro; and Kishimoto, Takuya, 5,161,115, Cl. 364-551.010.
Tsutsumitake, Hideyuki, 5,161,224, Cl. 395-600.000.
Wada, Satoshi; Wakabayashi, Shinichi; and Fukuda, Masayo, 5,160,995, Cl. 257-207.000.
Watanabe, Yoshitaka, 5,161,220, Cl. 395-425.000.
Yaguchi, Toshiyuki; and Tanaka, Koichi, 5,161,160, Cl. 371-22.300.
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Yasuki, Seijiro; Kawai, Kiyoyuki; and Taga, Noboru, 5,161,003, Cl. 358-141.000.
Kadorian, Gregory S.: *See*—
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Kaga, Yasuhiro; Hattori, Kei; Hasegawa, Isahiro; and Komatsu, Fumio, to Kabushiki Kaisha Toshiba. Method of and apparatus for measuring pattern profile. 5,161,201, Cl. 382-8.000.
Kagan, Yishai: *See*—
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Kageyama, Fumio: *See*—
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Kageyama, Shigeki: *See*—
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Kageyama, Yoshiteru; Sawada, Yoshiaki; and Yoshida, Akira, to Mitsubishi Petrochemical Company Limited. Electrode for a coulometric type of electrochemical detector. 5,160,419, Cl. 204-294.000.
Kaiser, Frederick J., Jr.: *See*—
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Kajima Corporation: *See*—
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Kajimoto, Takeshi; Shimbo, Yutaka; Sato, Katsuyuki; Ogata, Masahiro; Kenmizaki, Kanehide; Kubono, Shouji; Kato, Nobuo; Manita, Kiichi; and Kanamitsu, Michitaro, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Data output buffer for a semiconductor memory. 5,161,120, Cl. 365-189.050.
Kajita, Harumasa; Yanagimichi, Toyokazu; Kariya, Tetsuo; Wakabayashi, Toshikazu; Kawashima, Ichiro; Nakanami, Satoshi; and Tanaka, Masami, to Matsushita Electric Industrial Co., Ltd. Cable television system. 5,161,187, Cl. 380-15.000.
Kambara, Goro, to Hermco. Shaft travel devices such as vertical lift arm devices. 5,160,238, Cl. 414-663.000.
Kamei, Kenji: *See*—
Kodama, Kenzaburo; Kamei, Kenji; Yoshida, Kousuke; Ishikawa, Katsuya; Kubo, Yukio; and Takatani, Yoshiaki, 5,160,708, Cl. 422-171.000.
Kamen, Melvin E., to Revlon Consumer Products Corporation. Apparatus and method for manufacturing cosmetic products. 5,160,689, Cl. 264-297.800.
Kamio, Shigeru: *See*—
Abe, Tomoaki; Maeda, Katsuya; Hara, Mitsuo; Kamio, Shigeru; and Takao, Mitsunori, 5,159,990, Cl. 180-197.000.
Kamiyama, Hiroshi: *See*—
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Kamizawa, Koh: *See*—
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Kanai, Takashi; Miyazaki, Kunio; and Tsuzuku, Masayuki, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Hub table for a magnetic disk drive device. 5,161,075, Cl. 360-99.040.
Kanai, Toshio, to Matsushita Electric Industrial Co., Ltd. CRT power supply apparatus having synchronized high and low voltage power supply switching circuits. 5,161,241, Cl. 363-65.000.
Kanamitsu, Michitaro: *See*—
Kajimoto, Takeshi; Shimbo, Yutaka; Sato, Katsuyuki; Ogata, Masahiro; Kenmizaki, Kanehide; Kubono, Shouji; Kato, Nobuo; Manita, Kiichi; and Kanamitsu, Michitaro, 5,161,120, Cl. 365-189.050.
Kanamori, Hiroo: *See*—
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Kanazawa, Minoru: *See*—
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Kandpal, Tara C., to Tecumseh Products Company. Thrust bearing for refrigeration compressor. 5,160,247, Cl. 417-415.000.
Kaneko, Akira: *See*—
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Kang, Andrew H.: *See*—
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Kanga, Vispi, to Chesebrough-Pond's USA Co., Division of Conopco, Inc. Cosmetic composition. 5,160,739, Cl. 424-401.000.
Kanitz, Roger A.: *See*—
Eaton, Daniel J.; and Kanitz, Roger A., 5,160,583, Cl. 162-301.000.
Kanno, Makoto: *See*—
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Kansai Paint Company, Limited: *See*—
Hashimoto, Sadaaki; and Tomiyama, Takeshi, 5,160,778, Cl. 428-195.000.
Kanto Kasei Co., Ltd.: *See*—
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Kao Corporation: *See*—
Nomura, Masaki; Koike, Shin; Yamashita, Ko; Okisaka, Koichi; Sano, Yoshito; Omura, Hisao; Irinatsu, Yuuichi; Masui, Kenji; and Yasumasu, Takeshi, 5,160,759, Cl. 426-602.000.
Kapuscinski, Maria M.: *See*—
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Karetnikov, Evgeny V.: *See*—
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Kariya, Takao: *See*—
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Marumo, Mitsuji; Iwamoto, Kazunori; Mizusawa, Nobutoshi; Kariya, Takao; and Uzawa, Shunichi, 5,160,961, Cl. 355-53.000.
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Karlsson, Lars, to Triline AB. Device at a heat treatment oven. 5,160,258, Cl. 432-152.000.
Kasahara, Nobuo: *See*—
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Kashihara, Shigemitsu: *See*—
Totsuka, Nobuo; Kimura, Mitsuo; Kurisu, Takao; Mishiro, Yuji; Sengan, Masakazu; Ishizawa, Katsunobu; Kashihara, Shigemitsu; Kanazawa, Minoru; and Komatu, Nagahiro, 5,160,590, Cl. 204-141.500.
Kashiwagi, Nobuyoshi: *See*—
Sasaki, Masatomi; Kashiwagi, Nobuyoshi; Sakakibara, Hiroki; and Saruhashi, Makoto, 5,160,672, Cl. 264-41.000.
Kast, Howard B., to General Electric Company. Gas turbine engine fuel and hydraulic fluid pumping system. 5,159,808, Cl. 60-39.091.
Katagiri, Genichi: *See*—
Toraguchi, Makoto; Katagiri, Genichi; and Sakakibara, Yasushi, 5,160,152, Cl. 279-128.000.

Katakura, Kazuto: *See*—
Takahashi, Hideki; Tani, Shigemitsu; Fukano, Akira; Katakura, Kazuto; Makimoto, Hitoshi; and Watanabe, Yoshikazu, 5,160,964, Cl. 355-200.000.

Kataoka, Shigeru; and Shimizu, Shoichi, to Kabushiki Kaisha Toshiba. Field-effect transistor circuit. 5,160,858, Cl. 307-450.000.

Katase, Wataru: *See*—
Ichimura, Hiroshi; Minema, Ikumi; and Katase, Wataru, 5,161,022, Cl. 358-190.000.

Katayama, Hiroyuki: *See*—
Nakayama, Junichiro; Kimura, Kazuhiro; Katayama, Hiroyuki; and Ohta, Kenji, 5,160,572, Cl. 156-510.000.

Katayama, Yutaka, to Maruman Golf Kabushiki Kaisha. Iron golf club set. 5,160,137, Cl. 273-77.00A.

Kato, Akihiko: *See*—
Shiina, Yoshio; Kato, Akihiko; Isosu, Toru; Kanno, Makoto; and Sato, Akihiko, 5,160,966, Cl. 355-206.000.

Kato, Hisao, to Mitsubishi Denki Kabushiki Kaisha. Robotic apparatus and method for automobile assembly. 5,159,745, Cl. 29-407.000.

Kato, Kazuaki: *See*—
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, 5,160,546, Cl. 127-60.000.

Kato, Nobuo: *See*—
Kajimoto, Takeshi; Shimbo, Yutaka; Sato, Katsuyuki; Ogata, Masahiro; Kenmizaki, Kanehide; Kubono, Shouji; Kato, Nobuo; Manita, Kiichi; and Kanamitsu, Michitaro, 5,161,120, Cl. 365-189.050.

Kato, Toshiharu: *See*—
Okaniwa, Takashi; Takeuchi, Kiyoshi; Kato, Toshiharu; and Nagasawa, Keizo, 5,160,645, Cl. 252-32.70E.

Katoh, Hiroshi: *See*—
Wada, Minoru; Tanaka, Yoshiaki; Katoh, Hiroshi; and Taguchi, Hiroshi, 5,159,845, Cl. 74-6.000.

Katsoulis, Dimitris E.; Conway, Lori J.; and Schulz, William J., Jr., to Dow Corning Corporation. Encapsulated aluminum and aluminum-zirconium compositions. 5,160,732, Cl. 424-68.000.

Katsunuma, Tatsuo: *See*—
Mabuchi, Seiya; and Katsunuma, Tatsuo, 5,159,922, Cl. 128-52.000.

Katz, Solomon. Directory tab for organizing and tracking files. 5,160,296, Cl. 462-6.000.

Kawabata, Kazunobu, to Nissan Motor Co., Ltd. Active suspension system. 5,160,160, Cl. 280-707.000.

Kawabata, Kazunobu: *See*—
Tsukamoto, Masahiro; and Kawabata, Kazunobu, 5,160,161, Cl. 280-707.000.

Kawabe, Ushio: *See*—
Harada, Yutaka; Yano, Shinichiro; Miyake, Mutsuko; Kawabe, Ushio; and Nishino, Toshikazu, 5,160,983, Cl. 257-34.000.

Kawai Gakki Seisakusho Co., Ltd.: *See*—
Sakakibara, Noriyuki, 5,159,762, Cl. 33-832.000.

Kawai, Kiyoyuki: *See*—
Yasuki, Seijiro; Kawai, Kiyoyuki; and Taga, Noboru, 5,161,003, Cl. 358-141.000.

Kawai, Yasuhiro: *See*—
Niinai, Yoshitaka; Sagawa, Norihisa; Kawai, Yasuhiro; Igarashi, Sadato; and Ohyama, Hisanobu, 5,160,876, Cl. 318-460.000.

Kawaishi, Yasunori: *See*—
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.

Kawakami, Michiya: *See*—
Ohmi, Tadahiro; Kawakami, Michiya; Shibata, Tadashi; and Umeda, Masaru, 5,160,429, Cl. 210-137.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Kodama, Kenzaburo; Kamei, Kenji; Yoshida, Kousuke; Ishikawa, Katsuya; Kubo, Yukio; and Takatani, Yoshiaki, 5,160,708, Cl. 422-171.000.

Kawasaki Steel Corp.: *See*—
Totsuka, Nobuo; Kimura, Mitsuo; Kurisu, Takao; Mishiro, Yuji; Sengan, Masakazu; Ishizawa, Katsunobu; Kashihara, Shigemitsu; Kanazawa, Minoru; and Komatu, Nagahiro, 5,160,590, Cl. 204-141.500.
Yukumoto, Masao; Ozawa, Michiharu; Ishii, Kazuhide; and Shimizu, Hiroshi, 5,160,390, Cl. 148-325.000.

Kawashima, Ichiro: *See*—
Kajita, Harumasa; Yanagimichi, Toyokazu; Kariya, Tetsuo; Wakabayashi, Toshikazu; Kawashima, Ichiro; Nakanami, Satoshi; and Tanaka, Masami, 5,161,187, Cl. 380-15.000.

Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, to Towa Chemical Industry Co., Ltd. Lactitol trihydrate crystal, crystalline mixture solid containing it and process for preparing them. 5,160,546, Cl. 127-60.000.

Kawata, Norio; and Takuma, Masaaki, to Kabushiki Kaisha Toshiba. Car-mounted video displaying apparatus. 5,161,028, Cl. 358-254.000.

Kay, Mark L.; Loveless, Rodger D.; and Vinson, Bobby, to Burlington Industries, Inc. Multicolored piece-dyed rugs. 5,160,347, Cl. 8-481.000.

Kazuo, Taguchi: *See*—
Sawada, Toshiki; Yamano, Masaru; Kazuo, Taguchi; Kojima, Takao; Ishiguro, Hiroyuki; and Yamada, Masahiko, 5,160,598, Cl. 204-429.000.

Keating, Raymond; Sansone, Ronald P.; and Schumacher, Karl H., to Pitney Bowes Inc. Up/down loading of databases. 5,161,109, Cl. 364-464.020.

Keenan, Douglas M., to Thomson Consumer Electronics, Inc. Previous channel feature in a television receiver having multiple RF inputs. 5,161,023, Cl. 358-193.100.

Keene Corporation: *See*—
Fabbri, William C.; and Crane, Roy, 5,160,193, Cl. 362-33.000.

Kefer, Volker: *See*—
Franke, Joachim; Kefer, Volker; and Wittchow, Eberhard, 5,159,897, Cl. 122-367.300.

Kehl, Georg, to Robert Bosch GmbH. Cylinder-piston unit having central valve, in particular for vehicle brake systems. 5,159,871, Cl. 91-422.000.

Keim, Norbert; and Wittmann, Manfred, to Kabelmetal Electro GmbH. Process for the production of a blank mold for glass fiber optical waveguides. 5,160,520, Cl. 65-2.000.

Keizer, Klaas: *See*—
Huis In't Veld, Marcel B. J.; Uhlhorn, Robert J. R.; Lin, Yve-Sheng; Keizer, Klaas; and Burggraaf, Anthonie J., 5,160,617, Cl. 210-490.000.

Keller, R. Davidson, Jr. Membraneless chlorine gas generating apparatus. 5,160,596, Cl. 204-266.000.

Keller, Raymond J.: *See*—
Palisin, Stephen P., Jr.; and Keller, Raymond J., 5,160,031, Cl. 206-519.000.

Kelly, C. Michael: *See*—
Garg, Diwakar; Tsai, Wilman; Iampietro, Robert L.; Kimock, Fred M.; and Kelly, C. Michael, 5,160,544, Cl. 118-724.000.

Kelly, Thomas L.: *See*—
Reger, Vincent A.; Kelly, Thomas L.; and Groshong, LeRoy E., 5,160,342, Cl. 606-200.000.

Kenji, Naitou; Yasuhiro, Ohshima; and Tadao, Nagai, to Murata Mfg. Col, Ltd. Flyback transformer. 5,160,872, Cl. 315-411.000.

Kenmizaki, Kanehide: *See*—
Kajimoto, Takeshi; Shimbo, Yutaka; Sato, Katsuyuki; Ogata, Masahiro; Kenmizaki, Kanehide; Kubono, Shouji; Kato, Nobuo; Manita, Kiichi; and Kanamitsu, Michitaro, 5,161,120, Cl. 365-189.050.

Kennametal Inc.: *See*—
Rowlett, Don C., 5,159,985, Cl. 172-723.000.

Kenney, Martin J., to Ultrasonic Arrays, Inc. Capacitive transducer system and method. 5,161,128, Cl. 367-181.000.

Keppel, William. Method and apparatus for measuring and controlling the level of hormones in an animal circulatory system. 5,159,928, Cl. 128-630.000.

Keren, Hanan, to Elscint Ltd. Surface coil array receiver. 5,160,891, Cl. 324-318.000.

Kerr-McGee Corporation: *See*—
Owen, S. Hudson; Baldwin, Roger A.; Taylor, Gerald E.; and Wolff, Paul A., 5,160,084, Cl. 238-310.000.

Khalar, Lawrence J. Conveyor structure for the sidewall of a bottle combiner. 5,160,014, Cl. 198-453.000.

Khazai, Bijan; and Moore, William G., to Dow Chemical Company, The. Process for producing metal borides using finely comminuted mixture of reactants. 5,160,698, Cl. 419-12.000.

Khouw, Frank H. H.; Spiessens, Marinus J.; Nieskens, Martin J. P. C.; and Woudstra, Jouke J., to Shell Oil Company. Process for the catalytic cracking of a hydrocarbon oil. 5,160,706, Cl. 422-140.000.

Kicherer, Robert; and Schreder, Felix, to E.G.O. Elektro-Gerate Blanc u. Fischer. Electric hotplate. 5,160,830, Cl. 219-458.000.

Kiefer, Keith A.: *See*—
Andersen, David A.; Kiefer, Keith A.; and Hones, Leonard D., 5,160,801, Cl. 89-6.000.

Kikuchi, Eiji: *See*—
Nishiyama, Tohru; and Kikuchi, Eiji, 5,161,101, Cl. 364-191.000.

Kikuchi, Katsumori: *See*—
Tanaka, Hitoshi; and Kikuchi, Katsumori, 5,161,066, Cl. 359-823.000.

Kikuchi, Masatsune; Omori, Hiroshi; Hosoda, Hatsutoshi; and Kouda, Susumu, to Onoda Cement Co., Ltd. Cement setting accelerator and method of manufacturing the same. 5,160,376, Cl. 106-819.000.

Kikuchi, Shuichi: *See*—
Funayama, Masanori; and Kikuchi, Shuichi, 5,161,080, Cl. 360-133.000.

Killinger, Erich, to Dambach-Werke GmbH. Display apparatus for alphanumeric displays. 5,160,921, Cl. 340-783.000.

Kim, Jae Hyun, to Goldstar, Co., Ltd. Step-recording apparatus and method for automatic music-performing system. 5,160,797, Cl. 84-613.000.

Kim, Jeong-Hoon, to Samsung Electronics Co., Ltd. Method of interpolating an image signal using a slope correlation and a circuit thereof. 5,161,016, Cl. 358-166.000.

Kim, Jin S. Beauty kit for aid in hairstyle selection. 5,160,265, Cl. 434-94.000.

Kimberly-Clark Corporation: *See*—
Dodge, Richard N., II; Wagner, Ann L.; Fowler, Larry C.; Allen, Martin A.; and Fetcko, John T., III, 5,160,746, Cl. 425-7.000.

Kimble, James B.; and Kolts, John H., to Phillips Petroleum Company. Composition of matter and method of oxidative conversion of organic compounds therewith. 5,160,502, Cl. 585-500.000.

Kimock, Fred M.: *See*—
Garg, Diwakar; Tsai, Wilman; Iampietro, Robert L.; Kimock, Fred M.; and Kelly, C. Michael, 5,160,544, Cl. 118-724.000.

Kimoto, Takayuki: *See*—
Murata, Jun; Sunohara, Masaaki; and Kimoto, Takayuki, 5,160,361, Cl. 65-102.000.

Kimura, Hiroyoshi; and Nishiyama, Shinroku, to Nippon Metal Co., Ltd. Dust collection apparatus. 5,159,737, Cl. 15-314.000.

Kimura, Junko; and Tanaka, Shigeo, to Kabushiki Kaisha Toshiba. Apparatus for processing data for a video tape recorder. 5,161,031, Cl. 358-310.000.

Kimura, Kazuhiro: *See*—
Nakayama, Junichiro; Kimura, Kazuhiro; Katayama, Hiroyuki; and Ohta, Kenji, 5,160,572, Cl. 156-510.000.

Kimura, Masashi: *See*—
Morihara, Kazushige; Kimura, Masashi; and Yamauchi, Shin, 5,161,084, Cl. 361-225.000.

Kimura, Mitsuo: *See*—
Totsuka, Nobuo; Kimura, Mitsuo; Kurisu, Takao; Mishiro, Yuji; Sengan, Masakazu; Ishizawa, Katsunobu; Kashihara, Shigemitsu; Kanazawa, Minoru; and Komatu, Nagahiro, 5,160,590, Cl. 204-141.500.

Kimura, Noriyuki: *See*—
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.

Kimura, Takashi; and Nomura, Keiji, to Nissan Motor Company, Limited. System and method for controlling multiplex communications between master station and slave stations. 5,161,151, Cl. 370-13.000.

Kinjo, Naoto: *See*—
Murakami, Tokumichi; Kamizawa, Koh; Kinjo, Naoto; Ohira, Hideo; and Wakabayashi, Takao, 5,161,247, Cl. 395-800.000.

Kinugawa, Hideki: *See*—
Yoshimatsu, Hideaki; Hayashi, Norihiko; and Kinugawa, Hideki, 5,160,056, Cl. 212-155.000.

Kirby, Michael A., Sr.: *See*—
Adams, John M.; Chance, Christopher N.; DeBlasio, James A.; Evers, Donald H.; Harris, William C., Jr.; Kirby, Michael A., Sr.; Newsome, Reginald W.; Pham, Xuan M.; and Talley, Robert E., 5,160,023, Cl. 206-256.000.

Kiriyama, Shuhachi, to Yamanouchi Pharmaceutical Co., Ltd. Composition for prevention or treatment of hypertriglyceridemia. 5,160,736, Cl. 424-195.100.

Kirkpatrick, Steven J.; Bertagna, Richard W.; and Gutwein, Roger W., to Procter & Gamble Company, The. Process for making reduced density coffee. 5,160,757, Cl. 426-466.000.

Kirschner, Lawrence; Lajoie, Michael S.; and Spears, William E., Jr., to Church & Dwight Co., Inc. Process for removing coatings from sensitive substrates, and blasting media useful therein. 5,160,547, Cl. 134-7.000.

Kishiki, Hiroshi: *See*—
Satoh, Masahiro; Watanabe, Tetsuya; Yoshio, Kunikiyo; and Kishiki, Hiroshi, 5,160,662, Cl. 252-299.610.

Kishimoto, Takuya: *See*—
Teshima, Fumiaki; Inoue, Katsuhiro; Kurebayashi, Kaoru; Mihara, Yukihiro; and Kishimoto, Takuya, 5,161,115, Cl. 364-551.010.

Kiss, Michael Z. Wireless bistatic link intrusion detection system. 5,160,915, Cl. 340-552.000.

Kita, Eizo: *See*—
Kuwabara, Takao; and Kita, Eizo, 5,160,244, Cl. 417-36.000.

Kitada, Masahito: *See*—
Yoshimura, Hiroshi; Kitada, Masahito; Takeuchi, Koichiro; and Doi, Junichi, 5,159,856, Cl. 74-867.000.

Kitagawa, Hiroshi; Oono, Tetsuya; and Suzuki, Norio, to Honda Giken Kogyo Kabushiki Kaisha. Device for correcting error between accelerator pedal position sensor and throttle valve position sensor. 5,159,831, Cl. 73-118.100.

Kitakado, Ryuji; Yano, Hironobu; and Hoki, Tetsuo, to Dainippon Screen Mfg. Co. Ltd. Method of and device for inspecting pattern of printed circuit board. 5,161,202, Cl. 382-8.000.

Kiyomiya, Yutaka: *See*—
Sasaki, Yutaka; Kiyomiya, Yutaka; Nakamura, Toshio; Mori, Kunio; and Morii, Akimitsu, 5,160,721, Cl. 423-376.000.

Kizaki, Masayasu: *See*—
Tanoi, Minoru; and Kizaki, Masayasu, 5,161,009, Cl. 359-82.000.

Kizaki, Takayasu; Park, Chong-il; and Yamada, Reiichi, to Kyocera America, Inc. Apparatus for manufacturing ceramic chip-resistant chamfered integrated circuit package. 5,160,747, Cl. 425-352.000.

Klaass, Reinhard M.; Minshall, Bert J.; Suriano, Francis J.; and Caan, William, to Allied-Signal Inc. Integrated power unit combustion apparatus and method. 5,160,069, Cl. 60-39.060.

Klappert, Walter R., to WNM Ventures Inc. Branching table for interactive video display. 5,161,034, Cl. 358-342.000.

Klee, Mareike K.: *See*—
Brand, Hans-Wolfgang; Klee, Mareike K.; De Vries, Johan W. C.; Waser, Rainer M.; and Wolters, Robertus A. M., 5,160,762, Cl. 427-79.000.

Kleefisch, Jeffery L.; and Spaeth, Vincent G., to Nalco Chemical Company. Cyanide removal from coke oven wash waters. 5,160,632, Cl. 210-724.000.

Klein, Hermann-Josef; Adam, Klaus; and Wuerth, Juergen, to Robert Bosch GmbH. Apparatus for electronic engine control with performance check for the final ignition stage. 5,159,912, Cl. 123-481.000.

Klippare, Sten: *See*—
Svensson, Per; and Klippare, Sten, 5,160,519, Cl. 55-482.000.

Klocke, Donald J.: *See*—
Chu, Pochen; Klocke, Donald J.; Marler, David O.; McWilliams, John P.; and Vartuli, James C., 5,160,500, Cl. 585-486.000.

Klohs, Wayne; and Ramu, Avner, to Warner-Lambert Company; and Hadasit Medical Research Services and Development. Tumor cell sensitization method using quinazolinedione derivatives. 5,160,727, Cl. 424-10.000.

Klose, Odo, to Friedrich Grohe Armaturenfabrik GmbH & Co. Snap coupling with temperature readout for hand shower. 5,160,197, Cl. 374-147.000.

Kneller, Mills T.: *See*—
Bosworth, Mark E.; Dunn, Thomas J.; Hall, Warren E.; Johnson, Richard G.; Kneller, Mills T.; Lin, Youlin; Wallace, Rebecca A.; White, David H.; and Wong, David M., 5,160,437, Cl. 210-651.000.

Knowlton, Kenneth C., to Wang Laboratories, Inc. Method for black and white image reduction based upon averaging black/white pixel counts of neighboring blocks. 5,161,213, Cl. 395-128.000.

Knudson, Milburn L., Jr.; and Jones, Thomas R., to Southern Clay Products, Inc. Process for manufacturing organoclays having enhanced gelling properties. 5,160,454, Cl. 252-315.200.

Kobashi, Koji: *See*—
Miyauchi, Shigeaki; Miyata, Koichi; Kumagai, Kazuo; and Kobashi, Koji, 5,160,405, Cl. 156-643.000.

Kobayashi, Kazushi: *See*—
Odawara, Shiro; Ito, Keiichi; and Kobayashi, Kazushi, 5,160,040, Cl. 210-167.000.

Kobayashi, Kazuyuki, to Mitsubishi Jukogyo Kabushiki Kaisha. Vertical internal combustion engine with overhead valves. 5,159,909, Cl. 123-188.140.

Kobayashi, Kenichi: *See*—
Naoi, Yasushi; Kobayashi, Kenichi; Ota, Harutoshi; and Kuribayashi, Yasushi, 5,159,850, Cl. 74-523.000.

Kobayashi, Kenzo; Shimizu, Kenichi; and Yoshioka, Hideaki, to Kobayashi, Kenzo; Shimizu, Kenichi; and Yoshida Kogyo K.K. Process for coloring titanium and its alloys. 5,160,599, Cl. 205-106.000.

Kobayashi, Nobuo: *See*—
Tsujii, Gen; Kobayashi, Nobuo; and Takano, Fumitomo, 5,160,820, Cl. 219-116.000.

Kobayashi, Shigeru: *See*—
Seki, Masafumi; Hashizume, Hideki; Nakama, Kenichi; and Kobayashi, Shigeru, 5,160,360, Cl. 65-30.130.

Kobayashi, Yuji; and Takamori, Tsutomu, to Sony Corporation. Velocity error generator with first-order interpolation. 5,161,032, Cl. 358-326.000.

Kocal, Joseph A.: *See*—
Holmgren, Jennifer S.; Gembicki, Stanley A.; Schoonover, Michael W.; and Kocal, Joseph A., 5,160,032, Cl. 208-46.000.

Kodama, Kenzaburo; Kamei, Kenji; Yoshida, Kousuke; Ishikawa, Katsuya; Kubo, Yukio; and Takatani, Yoshiaki, to Kawasaki Jukogyo Kabushiki Kaisha. Dry type simultaneous desulfurization and dedusting apparatus and method of operation therefor. 5,160,708, Cl. 422-171.000.

Koga, Keiji; Satoh, Jun-ichi; Yokoyama, Kenji; Nisizawa, Akinori; and Tokuoka, Yasumichi, to TDK Corporation. Method for making a magnetic disk. 5,160,761, Cl. 427-548.000.

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Kohl, Walter: *See*—
Schramm, Guenter; Kohl, Walter; and Meyer, Friedhelm, 5,160,881, Cl. 322-7.000.

Kohlert, Rudolf: *See*—
Fischer, David; and Kohlert, Rudolf, 5,160,151, Cl. 279-121.000.

Kohmura, Toshimi: *See*—
Nemoto, Yousui; Itoh, Akiyoshi; Kohmura, Toshimi; and Horiba, Yasuhiro, 5,160,783, Cl. 428-261.000.

Kohonen, Raimo: *See*—
Heino, Jukka; and Kohonen, Raimo, 5,160,434, Cl. 210-391.000.

Koide, Jun, to Canon Kabushiki Kaisha. Image forming apparatus with small LED array. 5,160,965, Cl. 355-202.000.

Koike, Masato: *See*—
Matsuo, Makoto; Utsumi, Minoru; Ogusu, Chihaya; Mukasa, Shunsuke; Kudo, Yoshiaki; Obata, Hiroyuki; Aono, Takashi; Mohri, Hiroshi; Koike, Masato; Amano, Hideaki; and Saito, Norikazu, 5,161,233, Cl. 355-218.000.

Koike, Shin: *See*—
Nomura, Masaki; Koike, Shin; Yamashita, Ko; Okisaka, Koichi; Sano, Yoshito; Omura, Hisao; Irinatsu, Yuuichi; Masui, Kenji; and Yasumasu, Takeshi, 5,160,759, Cl. 426-602.000.

Koike, Syuzo: *See*—
Taniguchi, Naohiro; Koike, Syuzo; Watanabe, Yasuhiko; Takeuchi, Tadao; and Fujiwara, Noboru, 5,160,041, Cl. 210-205.000.

Koizumi, Koreaki; So, Teruhiko; and Satio, Tetsuya, to Daido Tokushuko Kabushiki Kaisha. Vaccum refining method utilizing induction heater around a ladle in a vacuum container. 5,160,531, Cl. 75-10.150.

Kojima, Takao: *See*—
Sawada, Toshiki; Yamano, Masaru; Kazuo, Taguchi; Kojima, Takao; Ishiguro, Hiroyuki; and Yamada. Masahiko, 5,160,598, Cl. 204-429.000.

Kokubo, Kenichi: *See*—
Fujisawa, Masanori; and Kokubo, Kenichi, 5,160,897, Cl. 330-274.000.

Kolts, John H.: *See*—
Kimble, James B.; and Kolts, John H., 5,160,502, Cl. 585-500.000.

Komatsu, Fumio: *See*—
Kaga, Yasuhiro; Hattori, Kei; Hasegawa, Isahiro; and Komatsu, Fumio, 5,161,201, Cl. 382-8.000.

Komatsu Zenoah Kabushiki Kaisha: *See*—
Wada, Minoru; Tanaka, Yoshiaki; Katoh, Hiroshi; and Taguchi, Hiroshi, 5,159,845, Cl. 74-6.000.

Komatu, Nagahiro: *See*—
Totsuka, Nobuo; Kimura, Mitsuo; Kurisu, Takao; Mishiro, Yuji; Sengan, Masakazu; Ishizawa, Katsunobu; Kashihara, Shigemitsu; Kanazawa, Minoru; and Komatu, Nagahiro, 5,160,590, Cl. 204-141.500.

Kondo, Osamu; Hirata, Masukazu; and Arii, Mitsuzo, to Mitsubishi Gas Chemical Co., Inc. Process for producing silica glass plate having controlled refractive index distribution. 5,160,358, Cl. 65-18.200.

Kondo, Teruhisa; Tojo, Tetsuro; and Watanabe, Nobuatsu, to Toyo Tanso Co., Ltd. Carbon electrode, and method and apparatus for the electrolysis of a hydrogen fluoride-containing molten salt with the carbon electrode. 5,160,415, Cl. 204-60.000.

Kone Elevator GmbH: *See*—
Sissala, Mikko; and de Jong, Johannes, 5,159,995, Cl. 187-88.000.

Konica Corporation: *See*—
Haneda, Satoshi; Morita, Shizuo; Fukuchi, Masakazu; and Matsuo, Shunji, 5,160,963, Cl. 355-200.000.

Konicek, Jiri D.; Smith, Robert P.; and Zeroth, Jerry C., to Allied-Signal Inc. System and method for manufacturing copper clad glass epoxy laminates. 5,160,567, Cl. 156-288.000.

Konishi, Junji: *See*—
Sugawara, Yukio; Hayashi, Mineo; Konishi, Junji; and Hayashi, Shosaku, 5,160,588, Cl. 204-109.000.

Konishi, Toru: *See*—
Hamuro, Mitsuro; and Konishi, Toru, 5,160,066, Cl. 221-172.000.

Kono, Mitsunobu, to Kabushiki Kaisha Toshiba. DC motor controller with high reliability. 5,160,875, Cl. 318-280.000.

Kopf-Sill, Anne R.; and Zuk, Robert, to Molecular Devices Corporation. Analyzer with improved rotor structure. 5,160,702, Cl. 422-72.000.

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Rothfuss, Hans; Metzger, Herbert; Winkelman, Manfred; Winkler, Hans G.; and Kopia, Jochen, 5,160,478, Cl. 266-200.000.

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Kosaka, Michitaka; Sasaki, Toshiro; Matsumoto, Kuniaki; Akashi, Kichizo; and Suemitsu, Satoru, to Hitachi, Ltd. Real time status monitoring system. 5,161,103, Cl. 364-408.000.

Koshizawa, Toshifumi, to Isuzu Motors Limited. Distance measuring equipment for a car. 5,160,971, Cl. 356-5.000.

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Inman, Larry; and Koskela, Mike, 5,159,877, Cl. 100-144.000.

Kosuge, Katsunori; and Tsunashima, Atsumu, to Director-General of Agency of Industrial Science and Technology. Method of producing kenyaite-type phyllosilicate. 5,160,718, Cl. 423-332.000.

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Ina, Hideki; Kosugi, Masao; and Suzuki, Akiyoshi, 5,160,957, Cl. 355-43.000.

Kouda, Katsuya; and Iwanaga, Masaharu, to Hitachi, Ltd. Method for controlling data transfer buffer. 5,161,215, Cl. 395-250.000.

Kouda, Susumu: *See*—
Kikuchi, Masatsune; Omori, Hiroshi; Hosoda, Hatsutoshi; and Kouda, Susumu, 5,160,376, Cl. 106-819.000.

Koukal, Heinz; Dusterhoft, Richard; and Trube, Hans, to Mercedes-Benz AG. Air guide box. 5,160,293, Cl. 454-69.000.

Kovak, Kenneth W.; Agrawal, Rakesh; and Peterson, Janice C., to Air Products and Chemicals, Inc. Method of purifying argon through cryogenic adsorption. 5,159,816, Cl. 62-22.000.

Koves, William J., to UOP. Inlet stream debris collection method and apparatus. 5,160,513, Cl. 55-74.000.

Kowansky, Ann: *See*—
Moore, Charles A.; Kowansky, Ann; Flood, Robert W.; and Caveney, L. Patrick, 5,160,300, Cl. 474-257.000.

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Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Koyama, Yoshihisa; and Uchiyama, Yuji, 5,161,007, Cl. 358-43.000.

Kozyreff, Michel: *See*—
Castagner, Bernard; Cord, Paul-Philippe; Doin, Bernard; and Kozyreff, Michel, 5,160,163, Cl. 280-740.000.

Kramer, Erich, to Metri Airfluid AG. Apparatus for fluidizing and transferring powdered material. 5,159,765, Cl. 34-57.00R.

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Chapman, John R.; and Jones, David S., 5,160,841, Cl. 250-288.000.

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Pemawansa, Kariyawasam P. W.; Heisler, Mark D.; and Kraus, Menahem, 5,160,626, Cl. 210-638.000.

Krauss-Maffei Aktiengesellschaft: *See*—
Eichlseder, Martin; and Lichtinger, Peter, 5,160,751, Cl. 425-556.000.

Kraynak, Timothy L.: *See*—
Travor, Bruce W.; Marshall, Frank P.; and Kraynak, Timothy L., 5,160,800, Cl. 89-1.570.

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Kuch, Ingo; and Kretschmer, Jurgen, 5,160,562, Cl. 156-189.000.

Krill, Daniel M.; and Moore, Duncan T., to University of Rochester. Objectives for an optical data storage head. 5,161,063, Cl. 359-654.000.

Krishnakumar, Suppayan M.: *See*—
Collette, Wayne N.; Miller, Bryan H.; Krishnakumar, Suppayan M.; and Nahill, Thomas E., 5,160,059, Cl. 215-1.00C.

Krofta, Milos, to Lenox Institute for Research, Inc. Water improved apparatus for aerating. 5,160,611, Cl. 210-205.000.

Krom, Thomas J., to Square D Company. Anti-turning double-ended bolt assembly. 5,160,284, Cl. 439-797.000.

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Deugo, L. Scott; Mansfield, Andrew; Salzman, Michael; von Huene, Bernhard; and von Huene, Eberhard, 5,159,793, Cl. 52-126.100.

Krug, John A.; Willis, William L.; Dumser, Paul J.; Casseau, William U.; Deet, William T.; Culligan, Laurence E.; and Walter, Bruce A., to ACF Industries, Inc. Railway car underbody structure and method. 5,159,882, Cl. 105-362.000.

Krzysik, Duane G.; and LeGrow, Gary E., to Dow Corning Corporation. Alkylmethylsiloxane containing perfume compositions. 5,160,494, Cl. 512-3.000.

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Yoshida, Hiroshi; Shibazaki, Mitsuhiro; Kubo, Hiroaki; and Jinbo, Shunji, 5,160,220, Cl. 405-236.000.

Kubo, Yukio: *See*—
Kodama, Kenzaburo; Kamei, Kenji; Yoshida, Kousuke; Ishikawa, Katsuya; Kubo, Yukio; and Takatani, Yoshiaki, 5,160,708, Cl. 422-171.000.

Kubono, Shouji: *See*—
Kajimoto, Takeshi; Shimbo, Yutaka; Sato, Katsuyuki; Ogata, Masahiro; Kenmizaki, Kanehide; Kubono, Shouji; Kato, Nobuo; Manita, Kiichi; and Kanamitsu, Michitaro, 5,161,120, Cl. 365-189.050.

Kuch, Ingo; and Kretschmer, Jurgen, to Daimler-Benz AG. Process for producing a hollow fiber-composite body. 5,160,562, Cl. 156-189.000.

Kuczynski, Robert J.: *See*—
Atkinson, Gary B.; Kuczynski, Robert J.; and Desmond, Dennis P., 5,160,711, Cl. 423-22.000.

Kudo, Yoshiaki: *See*—
Matsuo, Makoto; Utsumi, Minoru; Ogusu, Chihaya; Mukasa, Shunsuke; Kudo, Yoshiaki; Obata, Hiroyuki; Aono, Takashi; Mohri, Hiroshi; Koike, Masato; Amano, Hideaki; and Saito, Norikazu, 5,161,233, Cl. 355-218.000.

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Schmelzer, Heinz; and Kuechler, Manfred, 5,160,764, Cl. 427-208.400.

Kugimiya, Shuzo; Fukumochi, Yoji; Sata, Ichiko; Hirai, Tokyuki; and Suzuki, Hitoshi, to Sharp Corporation. Machine translation apparatus having a process function for proper nouns with acronyms. 5,161,105, Cl. 364-419.000.

Kuhn, Reinhard: *See*—
Buhler, Ulrich; Kuhn, Reinhard; and Boos, Margareta, 5,160,495, Cl. 534-854.000.

Kulkarni, Prakash S.: *See*—
Ganesan, Madurai G.; Desai, Narendra R.; Maier, Gary A.; and Kulkarni, Prakash S., 5,160,734, Cl. 424-78.380.

Kumagai, Kazuo: *See*—
Miyauchi, Shigeaki; Miyata, Koichi; Kumagai, Kazuo; and Kobashi, Koji, 5,160,405, Cl. 156-643.000.

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Inumochi, Mitsuo; Matsuura, Tsukasa; Yura, Shinsuke; and Kumagai, Munehito, 5,161,076, Cl. 360-104.000.

Kumagai, Tomoharu: *See*—
Gomi, Hiroshi; Kumagai, Tomoharu; Hirose, Masato; and Nishikawa, Masao, 5,159,988, Cl. 180-8.600.

Kume, Masaharu: *See*—
Ono, Michio; Kume, Masaharu; and Matsuo, Takayuki, 5,160,780, Cl. 428-220.000.

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Tozuka, Akira; Kurakake, Yasushi; and Mizuno, Kotaro, 5,160,799, Cl. 84-653.000.

Kurata, Naoji: *See*—
Morishita, Yoshii; Sugimoto, Yasushi; Hayashida, Shigeru; Ishikawa, Hiroko; Noda, Yoshiaki; Murakami, Shigeru; Sato, Munehiro; Saito, Yoshinori; Kurata, Naoji; and Sugita, Yoshio, 5,160,487, Cl. 430-59.000.

Kurebayashi, Kaoru: *See*—
Teshima, Fumiaki; Inoue, Katsuhiro; Kurebayashi, Kaoru; Mihara, Yukihiro; and Kishimoto, Takuya, 5,161,115, Cl. 364-551.010.

Kuri Chemical Engineers, Inc.: *See*—
Kuri, Setsuya, 5,160,428, Cl. 210-107.000.

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Kuribayashi, Yasushi: *See*—
Naoi, Yasushi; Kobayashi, Kenichi; Ota, Harutoshi; and Kuribayashi, Yasushi, 5,159,850, Cl. 74-523.000.

Kurihara, Yoshikuni. Hermetically sealed water pipe cleaning device. 5,159,956, Cl. 137-624.130.

Kurisu, Takao: *See*—
Totsuka, Nobuo; Kimura, Mitsuo; Kurisu, Takao; Mishiro, Yuji; Sengan, Masakazu; Ishizawa, Katsunobu; Kashihara, Shigemitsu; Kanazawa, Minoru; and Komatu, Nagahiro, 5,160,590, Cl. 204-141.500.

Kurita, Kazuyuki: *See*—
Itoh, Junichi; and Kurita, Kazuyuki, 5,160,998, Cl. 257-760.000.

Kurita Water Industries Ltd.: *See*—
Taniguchi, Naohiro; Koike, Syuzo; Watanabe, Yasuhiko; Takeuchi, Tadao; and Fujiwara, Noboru, 5,160,041, Cl. 210-205.000.

Kuroda, Kazuo, to Pioneer Electronic Corporation. Apparatus for playing video signal recording medium. 5,161,033, Cl. 358-336.000.

Kuroiwa, Takaaki: *See*—
Sakai, Yoshirou; Sadaoka, Yoshihiko; Matsuguchi, Masanobu; Kuroiwa, Takaaki; and Abe, Tooru, 5,161,085, Cl. 361-286.000.

Kurosaki, Tadao: *See*—
Sugimori, Yoshio; Takayama, Susumu; and Kurosaki, Tadao, 5,161,020, Cl. 358-183.000.

Kurose, Yoshikazu: *See—*
Suzuki, Hideto; Kurose, Yoshikazu; and Aoki, Shinji, 5,161,171, Cl. 375-108.000.

Kutchmarek, Darrell J.; and Stauffacher, James H., to Graber Industries, Inc. Method and apparatus for making an expandable cellular shade. 5,160,563, Cl. 156-204.000.

Kuwabara, Takao; and Kita, Eizo, to Hitachi, Ltd.; and Kansai Electric Power Co., Ltd. Pump system operable by variable-speed control. 5,160,244, Cl. 417-36.000.

Kuwabara, Tetsuo: *See—*
Yamamoto, Kiyoshi; Kuwabara, Tetsuo; Shigyo, Isamu; Ohmori, Masaki; and Yoshimura, Fumitaka, 5,160,362, Cl. 65-102.000.

Kuykendal, Robert L.; Usher, David R.; and Deichmann, Ronald S. Lighted laminar flow nozzle. 5,160,086, Cl. 239-18.000.

Kwack, Eug Y.: *See—*
Shakkottai, Parthasarathy; Kwack, Eug Y.; and Back, Lloyd, 5,159,843, Cl. 73-24.050.

Kwon, Young D.: *See—*
Li, Hsin L.; Prevorsek, Dusan C.; Harpell, Gary A.; and Kwon, Young D., 5,160,776, Cl. 428-109.000.

Kyocera America, Inc.: *See—*
Kizaki, Takayasu; Park, Chong-il; and Yamada, Reiichi, 5,160,747, Cl. 425-352.000.

Kyodo Printing Co., Ltd.: *See—*
Nakahara, Yoshihiko, 5,160,833, Cl. 235-449.000.

Kyowa Hakko Kogyo Co. Ltd.: *See—*
Yasumura, Shigeyoshi; Nishi, Tatsunari; and Ito, Seiga, 5,160,735, Cl. 424-94.630.

Labsystems Oy: *See—*
Tuunanen, Jukka; Narvanen, Ale; and Geysen, Mario, 5,160,378, Cl. 134-25.100.

Lafreniere, Loren F., to Rexham Corporation. Windowed folding cartons. 5,160,083, Cl. 229-162.000.

Lagerstedt, Torgny: *See—*
Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nabo, Olle, 5,160,311, Cl. 494-56.000.

Lahn, Gerard C.; Kaiser, Frederick J., Jr.; and Fiato, Rocco A., to Exxon Research and Engineering Company. Catalyst/heat-transfer medium for syngas generation. 5,160,456, Cl. 252-373.000.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See—*
Carron, Henry; and Jourdan-LaForte, Eric, 5,160,656, Cl. 252-99.000.
Foulard, Jean, 5,160,477, Cl. 266-99.000.
Libes, Jean-Louis; and Laureau, Georges, 5,160,065, Cl. 220-724.000.
Rotman, Frederic; Rancon, Yannick; Queille, Philippe; and Olivier, Michel, 5,160,765, Cl. 427-229.000.

Lajoie, Michael S.: *See—*
Kirschner, Lawrence; Lajoie, Michael S.; and Spears, William E., Jr., 5,160,547, Cl. 134-7.000.

Lam Research Corporation: *See—*
Robbins, Michael, 5,160,576, Cl. 156-626.000.

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Mehmke, Bernd, 5,161,238, Cl. 359-738.000.

Lambert, Susan L.; and Schoonover, Michael W., to UOP. Silicon enhanced amorphous silica-alumina. 5,160,493, Cl. 502-231.000.

Lambing, Cynthia L. T.; Colpo, James A.; and Herbein, William C., to Structural Laminates Company. Joining metal-polymer-metal laminate sections. 5,160,771, Cl. 428-57.000.

Lamoreaux, David G.: *See—*
Torkington, Richard S.; and Lamoreaux, David G., 5,160,903, Cl. 333-12.000.

Lampson, Butler W.; Hawe, William R.; Gupta, Amar; and Spinney, Barry A., to Digital Equipment Corporation. Pipelined cryptography processor and method for its use in communication networks. 5,161,193, Cl. 380-49.000.

Lamson, Michael A., to Texas Instruments Incorporated. Method of measuring semiconductor lead inductance by changing the dielectric constant surrounding the lead. 5,160,893, Cl. 324-654.000.

Lander, Stephen. Rear view projection system. 5,160,951, Cl. 353-79.000.

Landis, Thomas J., to Stry-Lenkoff Company. Mix and match invisible ink game. 5,160,266, Cl. 434-328.000.

Lange, Bernd: *See—*
Strackenbrock, Dieter; and Lange, Bernd, 5,160,359, Cl. 65-3.120.

Lanzillotti, Harry V.: *See—*
Hayward, Charles R.; Lanzillotti, Harry V.; Merrill, David E.; Sanders, Edward B.; Losee, D. Bruce, Jr.; and Hearn, John R., 5,159,940, Cl. 131-194.000.

Larreco, Michel M.; Spiquel, Jacques M.; and Tavernier, Herve, to Usinor Sacilor. Device for the continuous casting of thin metal strips between two rolls. 5,159,969, Cl. 164-415.000.

Larson, Gary B., to MacDermid, Incorporated. Process for manufacturing printed circuit employing selective provision of solderable coating. 5,160,579, Cl. 156-661.100.

Larson, Lynn D. Waterbed mattress with bellows spring insert. 5,159,725, Cl. 5-451.000.

Latchford, Ian S.; Vasquez, Patrica; Hemker, David J.; and Petit, Brigitte, to Applied Materials, Inc. Low pressure anisotropic etch process for tantalum silicide or titanium silicide layer formed over polysilicon layer deposited on silicon oxide layer on semiconductor wafer. 5,160,407, Cl. 156-656.000.

Latham, Frank: *See—*
Mullins, Malcolm H.; and Latham, Frank, 5,160,908, Cl. 335-68.000.

Laughlin, Patrick E. Eye shield. 5,159,938, Cl. 128-858.000.

Laukien, Dirk D., to Bruker Instruments, Inc. Method and apparatus for one sided magnetic resonance imaging. 5,160,888, Cl. 324-309.000.

Laureau, Georges: *See—*
Libes, Jean-Louis; and Laureau, Georges, 5,160,065, Cl. 220-724.000.

Law, Andrew B.; and Willingham, Gary L., to Rohm and Haas Company. Stabilized metal salt/3-isothiazolone combinations. 5,160,527, Cl. 71-67.000.

Lawrence, James, to Calcomp Inc. Self-adjusting motor mount for drive motors of a pen plotter. 5,159,848, Cl. 74-421.00A.

Lawson, Jack M. Pleated drapery system. 5,159,968, Cl. 160-348.000.

Lazar, Peter. Binding apparatus. 5,160,234, Cl. 412-20.000.

Le, Nam V., to Otis Engineering Corporation. Flapper valve. 5,159,981, Cl. 166-325.000.

Le, Q. N.; Owen, H.; and Schipper, P. H., to Mobil Oil Corporation. Hydrocarbon cracking, dehydrogenation and etherification process. 5,160,424, Cl. 208-67.000.

League, Richard B.: *See—*
Allen, William E.; Anderson, Paul D.; Bradbury, Walter J.; Hadank, John M.; and League, Richard B., 5,160,239, Cl. 414-699.000.

Leasure, Maurice G.: *See—*
Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,161,104, Cl. 364-410.000.

Leavitt, Dennis D.; and Takach, George A., Jr., to Parvus Corporation, The. Dynamic multivane electron arc beam collimator. 5,160,847, Cl. 250-505.100.

Leban, Karl; and Schweiger, Herbert, to Bohler Gesellschaft m.b.H. Cold-worked steel of high compressive strength and articles made thereof. 5,160,553, Cl. 148-318.000.

LeBlanc, Douglas R.: *See—*
Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,161,104, Cl. 364-410.000.

LeBlanc, Leo J., to ERW, Inc. Fuel containment cover assembly. 5,160,064, Cl. 220-644.000.

LeBlanc, Reynold J. Wrap band safety brake. 5,159,996, Cl. 188-77.00R.

LeCour, Edward M. Filter assembly having by-pass system. 5,160,037, Cl. 210-90.000.

Le Devehat, Eugene, to FMC Corporation. Selective pipe connection apparatus with multiple fluid inlets and outlets. 5,160,173, Cl. 285-26.000.

Ledger, Philip W.: *See—*
Cormier, Michel J. N.; Ledger, Philip W.; and Amkraut, Alfred, 5,160,741, Cl. 424-450.000.

Lee Company, The: *See—*
Lee, Leighton, II, 5,160,226, Cl. 411-72.000.

Lee, David J., to Indiana Mills and Manufacturing Inc. Low profile web adjuster. 5,160,186, Cl. 297-479.000.

Lee, David R.: *See—*
Ash, Kenneth C.; Crocker, William A.; Haygarth, John C.; Lee, David R.; Morris, Donald; Peterson, John R.; Riesen, Jon A.; and Yih, Robert S., 5,160,482, Cl. 423-75.000.

Lee, Fu-Ming; Hair, Robert L.; and Brown, Ronald E., to Phillips Petroleum Company. Extractive distillation of alcohol/ether/hydrocarbon mixtures. 5,160,414, Cl. 203-57.000.

Lee, Jeong-Woo, to SamSung Electronics Co., Ltd. Circuit for controlling the output of a sense amplifier. 5,160,861, Cl. 307-530.000.

Lee, Kwyro: *See—*
Shur, Michael; and Lee, Kwyro, 5,161,235, Cl. 257-24.000.

Lee, Leighton, II, to Lee Company, The. Tapered expansion sealing plug. 5,160,226, Cl. 411-72.000.

Lee, Neville K. S., to Digital Equipment Corporation. Method for increasing linear bit density in magneto-optical storage media. 5,161,134, Cl. 369-13.000.

LeFiles, James H.: *See—*
Misselbrook, John; Hoff, Edwin F., Jr.; Bergman, Elliot; McKinney, Larry J.; and LeFiles, James H., 5,160,530, Cl. 71-121.000.

Legare, Luc R. Illuminated concrete curbstone. 5,160,202, Cl. 362-153.100.

Leggett & Platt, Incorporated: *See—*
Bustos, Rafael T., 5,160,051, Cl. 211-59.200.

Legresy, Jean-Marc; and Marticou, Marc-Henri, to Aluminium Pechiney. Process for producing cathodes for cathodic sputtering based on aluminium-silicon alloys. 5,160,388, Cl. 148-552.000.

LeGrow, Gary E.: *See—*
Krzysik, Duane G.; and LeGrow, Gary E., 5,160,494, Cl. 512-3.000.

Lehto, Ari, to Vaisala Oy. Apparatus and method for measuring gas concentrations. 5,160,843, Cl. 250-343.000.

Leibovitz, Jacques: *See—*
Crawford, Robert K.; Leibovitz, Jacques; Miller, Daniel J.; and Chen, Kim H., 5,161,090, Cl. 361-385.000.

Leica Camera GmbH: *See—*
Watz, Walter, 5,161,060, Cl. 359-642.000.

Leica Heerbrugg AG: *See—*
Spiegel, Armin; and Rebhandl, Wolfgang, 5,159,760, Cl. 33-227.000.

Leidinger, Gustav: *See—*
Reinecke, Udo; and Leidinger, Gustav, 5,159,992, Cl. 180-307.000.

Leifeld, Ferdinand, to Truzschler GmbH & Co. KG. Method and apparatus for measuring, regulating and controlling the quantity of fiber tufts in flight. 5,159,840, Cl. 73-861.730.

Leipold, Ludwig; Rothleitner, Hubert; Sander, Rainald; and Tihanyi, Jenoe, to Siemens Aktiengesellschaft. MOSFET switch circuit for preventing the switch being turned on during deactivation of an inductive load. 5,160,862, Cl. 307-571.000.

Lemay, Patrick: *See*—
Serpelloni, Michel; and Lemay, Patrick, 5,160,680, Cl. 264-126.000.

Lemay, Richard A.; Tague, Steven A.; Izbicki, Kenneth J.; and Woods, William E., to Bull HN Information Systems Inc. Buffered address stack register with parallel input registers and overflow protection. 5,161,217, Cl. 395-375.000.

Lemire, Aime M.: *See*—
Seveno, Pierre L. P. M.; and Lemire, Aime M., 5,160,505, Cl. 8-471.000.

Lemire, Robert J.; and Hannick, John J. Slide plate adjustable orifice. 5,160,119, Cl. 251-212.000.

Lenker, Jay A.: *See*—
Brenneman, Rodney A.; and Lenker, Jay A., 5,160,341, Cl. 606-198.000.

Lenox Institute for Research, Inc.: *See*—
Krofta, Milos, 5,160,611, Cl. 210-205.000.

Lenth, Jurgen: *See*—
Pletz-Kirsch, Gerhard; and Lenth, Jurgen, 5,161,011, Cl. 358-148.000.

Leon, Saturnino. Method and apparatus for improving batting skills. 5,160,131, Cl. 273-26.00D.

Leopold, Raymond J.: *See*—
Bertiger, Bary R.; Leopold, Raymond J.; and Peterson, Kenneth M., 5,161,248, Cl. 455-17.000.

Lerch, Rolf: *See*—
Schlipfenbacher, Reiner; Mangold, Dieter; Lerch, Rolf; and Steinbiss, Joachim, 5,160,486, Cl. 422-56.000.

Leung, Peter K.: *See*—
Steiger, Ronald P.; and Leung, Peter K., 5,159,828, Cl. 73-38.000.

Leussler, Wilhelm: *See*—
Schmidt, Hermann; and Leussler, Wilhelm, 5,160,351, Cl. 55-12.000.
Steinbacher, Karl; Schmidt, Hermann; and Leussler, Wilhelm, 5,160,510, Cl. 55-7.000.

Levenson, Marc D., to International Business Machines Corporation. Magneto-optical storage system. 5,161,133, Cl. 369-13.000.

Lever Brothers Company, Division of Conopco, Inc.: *See*—
Corring, Robert, 5,160,448, Cl. 252-95.000.
Donker, Cornelis B.; Hull, Michael; and van de Pas, Johannes C., 5,160,655, Cl. 252-95.000.
Falou, Mohamad S.; Finch, Timothy D.; Garner-Gray, Peter F.; Hight, Andrew T.; Murphy, Martin M.; Newbold, Geoffrey; Niven, Ian E.; and Savill, Derek G., 5,160,654, Cl. 252-91.000.
Foster, Francis G., 5,160,641, Cl. 252-8.600.

Lever Brothers Company, Division of Conopo, Inc.: *See*—
Bortolotti, Fabrizio; Pietrantoni, Luciano; Swinkels, Petrus L. J.; and Waas, Marco, 5,160,657, Cl. 252-174.140.

Lewis, Patricia K.: *See*—
Senser, Karl E.; and Lewis, Patricia K., 5,159,721, Cl. 2-227.000.

Lewis, Vincent E., to Nalco Chemical Company. Method of inhibiting formation of fouling materials during basic washing of hydrocarbons contaminated with oxygen compounds. 5,160,425, Cl. 208-95.000.

Lexicon, Inc.: *See*—
Griesinger, David H., 5,161,197, Cl. 381-56.000.

Leyba, Todd: *See*—
Addink, Marvin; Hu, Cheney Y.; Leyba, Todd; Mullen, John J.; Till, Carolyn A.; and Holmes, Andrew W., 5,161,214, Cl. 395-145.000.

Leyden, Roger J.; and Surma, Terrance, to Se-Kure Controls, Inc. Garment anti-theft device. 5,160,048, Cl. 211-7.000.

Li, Chien C., to Allied-Signal Inc. Cooling medium for use in a thermal energy storage system. 5,159,971, Cl. 165-10.000.

Li, Hsin L.; Prevorsek, Dusan C.; Harpell, Gary A.; and Kwon, Young D., to Allied-Signal Inc. Ballistic-resistant composite article. 5,160,776, Cl. 428-109.000.

Li, Hsung-cheng. Exercising and physical conditioning apparatus. 5,160,302, Cl. 482-51.000.

Libes, Jean-Louis; and Laureau, Georges, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Protective structure for a shut-off valve of a toxic gas container. 5,160,065, Cl. 220-724.000.

Liboff, Abraham R.; McLeod, Bruce R.; and Smith, Stephen D., to Life Resonanoes, Inc. Methods and apparatus for regulating transmembrane ion movement utilizing selective harmonic frequencies and simultaneous multiple ion regulation. 5,160,591, Cl. 204-155.000.

Lichtinger, Peter: *See*—
Eichlseder, Martin; and Lichtinger, Peter, 5,160,751, Cl. 425-556.000.

Liell, Peter: *See*—
Arnold, Kurt; and Liell, Peter, 5,159,890, Cl. 112-278.000.

Life Resonanoes, Inc.: *See*—
Liboff, Abraham R.; McLeod, Bruce R.; and Smith, Stephen D., 5,160,591, Cl. 204-155.000.

Lim, Jae S.: *See*—
Monta, Peter A.; Lim, Jae S.; and Parulski, Kenneth A., 5,161,006, Cl. 358-31.000.

Limousin, Jean L.: *See*—
Vives, Michel; and Limousin, Jean L., 5,160,471, Cl. 264-136.000.

Lin, Jung-Tai: *See*—
Chuang, Ching-Pao; and Lin, Jung-Tai, 5,159,947, Cl. 135-102.000.

Lin, Paul. Multifunctional gym exerciser with adjustment table. 5,160,305, Cl. 482-138.000.

Lin, Philip. Hold-down device for movable jaw of a vise. 5,160,127, Cl. 269-136.000.

Lin, Youlin: *See*—
Bosworth, Mark E.; Dunn, Thomas J.; Hall, Warren E.; Johnson, Richard G.; Kneller, Mills T.; Lin, Youlin; Wallace, Rebecca A.; White, David H.; and Wong, David M., 5,160,437, Cl. 210-651.000.

Lin, Yue-Sheng: *See*—
Burggraaf, Antonij J.; and Lin, Yue-Sheng, 5,160,618, Cl. 210-490.000.

Lin, Yve-Sheng: *See*—
Huis In't Veld, Marcel B. J.; Uhlhorn, Robert J. R.; Lin, Yve-Sheng; Keizer, Klaas; and Burggraaf, Anthonie J., 5,160,617, Cl. 210-490.000.

Lindall, Edward V., Jr.: *See*—
Fleming, Robert L., Jr.; Hart, Walter F., Jr.; Lindall, Edward V., Jr.; Reid, Ronnie D.; and Stewrat, John A., III, 5,159,733, Cl. 26-93.000.

Lindberg Corporation: *See*—
Thomas, James A., Sr., 5,160,020, Cl. 198-834.000.

Linde Aktiengesellschaft: *See*—
Vocke, Peter; Mahlo, Thomas; and Strigl, Reinhard, 5,160,380, Cl. 148-206.000.

Lindner, Wolfgang; Neuber, Hans-Ulrich; and Taschenbrecker, Erich, to Riedel-De Haen AG. Liquid preservatives. 5,160,666, Cl. 252-402.000.

Lintec Co., Ltd.: *See*—
Ono, Hirofumi; and Furukado, Tatsuhiko, 5,159,951, Cl. 137-486.000.

Linvatec Corporation: *See*—
Shuler, Donald K., 5,160,318, Cl. 604-22.000.

Lion Corporation: *See*—
Okahara, Mitsuo; and Masuyama, Araki, 5,160,450, Cl. 252-174.210.

Liston, Thomas V.: *See*—
Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, 5,160,650, Cl. 252-49.600.
Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, 5,160,651, Cl. 252-49.600.
Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, 5,160,652, Cl. 252-49.600.

Littleton, James G., to Texas Instruments Incorporated. Graphics cursor handler. 5,161,212, Cl. 395-118.000.

Liu, Benjamin Y. H., to MSP Corporation. High output monodisperse aerosol generator. 5,160,664, Cl. 252-305.000.

Liu, Hua-Kuang, to United States of America, Administrator, National Aeronautics and Space Administration. Large area projection liquid-crystal video display system with inherent grid pattern optically removed. 5,161,027, Cl. 358-231.000.

Livingston, Gaylord R. Mounting assembly for hand-held joiner. 5,160,114, Cl. 248-676.000.

Ljungstroem, Jan, to Siemens Aktiengesellschaft. Medical stimulation and/or monitoring device interacting with the body of a patient based upon selectable parameter set. 5,159,926, Cl. 128-419.0PG.

Lockhart, John E., to Revision Qix, Ltd. Loose leaf binder revision device and method of using same. 5,160,208, Cl. 402-24.000.

Lockyer, Terence D.: *See*—
Carter, Steven H.; Lockyer, Terence D.; and Gahan, Christopher J., 5,161,192, Cl. 380-48.000.

Loeb, Jean: *See*—
Bloch, Gerard; and Loeb, Jean, 5,159,726, Cl. 5-453.000.

Logan, Kathryn V., to Georgia Tech Research Corporation. Process for making highly reactive sub-micron amorphous titanium diboride power and products made therefrom. 5,160,716, Cl. 423-297.000.

Login, Robert; Bires, Carmen D.; and Walls, Edward W., Jr., to ISP Investments Inc. High water content hair spray composition. 5,160,729, Cl. 424-47.000.

Lohr, Curtis J.; and Huete, David A., to Shell Offshore Inc. Adjustable boat mooring system for a flexibility-supported tension leg platform. 5,159,891, Cl. 114-230.000.

Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., to UOP. Titanium-aluminum-silicon-oxide molecular sieve compositions. 5,160,717, Cl. 423-704.000.

Londono, Carmina: *See*—
Clark, Peter P.; and Londono, Carmina, 5,161,064, Cl. 359-663.000.

Long, Paul, to Micron Technology, Inc. Method of isotropically dry etching a polysilicon containing runner with pulsed power. 5,160,408, Cl. 156-656.000.

Longo, Anthony J., Jr., to Tiny-ettes Infant Shoes, Inc. Shoe with music generating unit in the tongue. 5,159,768, Cl. 36-139.000.

L'Oreal: *See*—
Dubief, Claude; and Cauwet, Daniele, 5,160,730, Cl. 424-59.000.

Lorenson, Claude P.: *See*—
Ball, Melville D.; Gallerneault, Christine E.; Hewitt, Bryan C.; and Lorenson, Claude P., 5,160,819, Cl. 219-10.55A.

Losee, D. Bruce, Jr.: *See*—
Hayward, Charles R.; Lanzillotti, Harry V.; Merrill, David E.; Sanders, Edward B.; Losee, D. Bruce, Jr.; and Hearn, John R., 5,159,940, Cl. 131-194.000.

Losing, Karl-Henrich: *See*—
Hartel, Gunter; Schurfeld, Armin; Losing, Karl-Henrich; Thonnessen, Dieter; and Remde, Ulrich, 5,159,898, Cl. 123-1.00A.

Lotte Company Limited: *See*—
Takemori, Toshio; Tsurumi, Toshinobu; and Takagi, Masahiro, 5,160,760, Cl. 426-660.000.
Love, Andrew M., to Texas Instruments Incorporated. Bond programmable integrated circuit. 5,161,124, Cl. 361-222.000.
Loveless, Rodger D.: *See*—
Kay, Mark L.; Loveless, Rodger D.; and Vinson, Bobby, 5,160,347, Cl. 8-481.000.
Lovelock, James E., to Hewlett-Packard Company. Water-vapour permeable material. 5,160,511, Cl. 55-16.000.
LSI Logic Corporation: *See*—
Chang, Yen C.; and Werner, Jeffrey A., 5,161,119, Cl. 364-786.000.
LTV Energy Products Company: *See*—
Arlt, Edward J., 5,160,219, Cl. 405-195.100.
Luber, Gary A. Container and lid apparatus. 5,160,067, Cl. 222-109.000.
Luber, Werner. Grinding or cutting-off disk for an automatic grinding machine for cleaning castings. 5,159,785, Cl. 51-206.00R.
Lubrizol Corporation, The: *See*—
Steckel, Thomas F., 5,160,648, Cl. 252-47.500.
Stoidt, Stephen H., 5,160,350, Cl. 44-347.000.
Lucas, Gregory L.: *See*—
Howard, James R.; and Lucas, Gregory L., 5,161,086, Cl. 361-321.000.
Lucas Ledex Inc.: *See*—
Mohler, David B.; and Robinson, Randy S., 5,161,083, Cl. 361-143.000.
Lucca, Eusebio; and Gillard, Paul H., to Matec Holding AG. Method for producing a formed structural element. 5,160,406, Cl. 156-62.400.
Lui, Herman. Sit-up belt. 5,160,306, Cl. 482-140.000.
LUK Lamellen und Kupplungsbau GmbH: *See*—
Reik, Wolfgang; and Jackel, Johann, 5,160,007, Cl. 192-70.170.
Lukacsovich, Tamas; Venetianer, Pal; Gaal, Tamas; Boros, Imre; and Baliko, Gabriella, to Richter Gedeon Vegyeszeti Gyar R.T. Expression vectors and method for their construction. 5,160,489, Cl. 435-172.300.
Lund, Gary K.; and Stevens, Mikel R., to Morton International, Inc. Gas generant formulations containing poly(nitrito) metal complexes as oxidants and method. 5,160,386, Cl. 149-88.000.
Lundquist, Lynn C. Method of continuous centrifugal removal of residual liquid waste from recyclable container material. 5,160,441, Cl. 210-781.000.
Luria, David, to Fuselage Engineering Services Ltd. Food storage and delivery system for passenger vehicles, particularly aircraft. 5,159,994, Cl. 186-40.000.
Lutz, David W. Apparatus for loading and unloading objects. 5,160,237, Cl. 414-609.000.
Lyckplay AB: *See*—
Bokhagen, Bernt, 5,160,145, Cl. 273-260.000.
Lyemance International, Inc.: *See*—
Sexton, Walter, 5,160,291, Cl. 454-7.000.
Lygren, Eivind, to Sunfish, Ltd. A.S. Method and apparatus for treating water. 5,160,620, Cl. 210-608.000.
Lykam, Mark A.; and Akagawa, Minoru, to Intelmatec Corporation. Pick-up head assembly. 5,160,181, Cl. 294-64.100.
Lynnworth, Lawrence C., to Panametrics, Inc. Marginally dispersive ultrasonic waveguides. 5,159,838, Cl. 73-644.000.
Lyons, Harold W.; and Stopa, James L., to Whelen Technologies, Inc. Rotatable warning light assembly. 5,160,874, Cl. 318-268.000.
M.K. Electric Limited: *See*—
Mullins, Malcolm H.; and Latham, Frank, 5,160,908, Cl. 335-68.000.
Maa, Pyn: *See*—
Chen, Li; and Maa, Pyn, 5,161,129, Cl. 368-19.000.
Mabuchi, Seiya; and Katsunuma, Tatsuo, to Bio Pit Co., Ltd. Massager. 5,159,922, Cl. 128-52.000.
Mabuchi, Toshiaki; and Nishikawa, Yoshikazu, to Canon Kabushiki Kaisha. Interchangeable lens camera system having improved control information communication facility. 5,161,026, Cl. 358-225.000.
Macaulay, Ernest W.; and Williams, Richard M., to Chesebrough-Pond's U.S.A. Co., Division of Conopco Inc. Cosmetic composition. 5,160,738, Cl. 424-401.000.
Maccabee, Bruce, to United States of America, Navy. Radiation selective system for target range and imaging readout. 5,161,125, Cl. 367-99.000.
MacDermid, Incorporated: *See*—
Larson, Gary B., 5,160,579, Cl. 156-661.100.
MacDonald, Lea H. Carpet cutting tool. 5,159,758, Cl. 30-294.000.
Machida Endoscope Co., Ltd.: *See*—
Chikama, Toshio, 5,159,919, Cl. 128-4.000.
Machida, Tetsuo; and Yamazaki, Tatsuya, to Sony Corporation. Disk cartridge made by injecting molten synthetic resin into a mold so that flash lines, weld lines and burn marks do not occur. 5,161,081, Cl. 360-133.000.
Mackall, Allen E.: *See*—
Shafer, Richard L.; and Mackall, Allen E., 5,159,825, Cl. 72-111.000.
Maeda, Katsuya: *See*—
Abe, Tomoaki; Maeda, Katsuya; Hara, Mitsuo; Kamio, Shigeru; and Takao, Mitsunori, 5,159,990, Cl. 180-197.000.
Mafoti, Robson, to Miles Inc. Internal release agents, active hydrogen containing mixtures which contain such agents and the use thereof in a process for the production of molded products. 5,160,538, Cl. 106-243.000.
Magara, Mitsuo: *See*—
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, 5,160,546, Cl. 127-60.000.
Magome, Nobutaka: *See*—
Ota, Kazuya; and Magome, Nobutaka, 5,160,849, Cl. 250-548.000.
Mahant-Shetti, Shivaling S.; Aton, Thomas J.; and Gale, Rebecca J., to Texas Instruments Incorporated. Scanning electron microscope based parametric testing method and apparatus. 5,159,752, Cl. 29-846.000.
Mahlo, Thomas: *See*—
Vocke, Peter; Mahlo, Thomas; and Strigl, Reinhard, 5,160,380, Cl. 148-206.000.
MAHO Aktiengesellschaft: *See*—
Babel, Werner, 5,160,824, Cl. 219-121.680.
Maier, Andreas, to MCA Micro Crystal AG. Drill bit or end mill with grooved flutes. 5,160,232, Cl. 408-223.000.
Maier, Gary A.: *See*—
Ganesan, Madurai G.; Desai, Narendra R.; Maier, Gary A.; and Kulkarni, Prakash S., 5,160,734, Cl. 424-78.380.
Maier, Josef: *See*—
Badstieber, Johann, 5,160,640, Cl. 249-189.000.
Makhija, Surender K.; Sparacino, Steven J.; and Burgess, Robert T., to Bear Automotive Service Equipment Company. Engine analyzer waveform display with a buffer region. 5,160,892, Cl. 324-379.000.
Makimoto, Hitoshi: *See*—
Takahashi, Hideki; Tani, Shigemitsu; Fukano, Akira; Katakura, Kazuto; Makimoto, Hitoshi; and Watanabe, Yoshikazu, 5,160,964, Cl. 355-200.000.
Malek-Khosravi, Behnam; McCullough, Matthew L.; and Domer, Steven M., to Unisys Corporation. Minimum pulsewidth test module on clocked logic integrated circuit. 5,161,161, Cl. 371-28.000.
Malick, Franklin S. Automatic incinerator apparatus. 5,159,884, Cl. 110-223.000.
Mallinckrodt Medical, Inc.: *See*—
Bosworth, Mark E.; Dunn, Thomas J.; Hall, Warren E.; Johnson, Richard G.; Kneller, Mills T.; Lin, Youlin; Wallace, Rebecca A.; White, David H.; and Wong, David M., 5,160,437, Cl. 210-651.000.
Maloney, James R.; and Moore, Joseph C., to Applied Materials, Inc. Method and apparatus for epitaxial deposition. 5,160,545, Cl. 118-725.000.
Mamizuka, Mitsuru: *See*—
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.
Manabe, Akira: *See*—
Takada, Kunio; Otani, Kenji; and Manabe, Akira, 5,160,216, Cl. 405-92.000.
Manchester Tool Company: *See*—
Simpson, Vandell E., III, 5,159,863, Cl. 82-1.110.
Mandell, Gerald D. Drinking straw. 5,160,087, Cl. 239-33.000.
Mangold, Dieter: *See*—
Schlipfenbacher, Reiner; Mangold, Dieter; Lerch, Rolf; and Steinbiss, Joachim, 5,160,486, Cl. 422-56.000.
Maniatis, Jimmy J. Golf putter including tuning fork effects. 5,160,144, Cl. 273-186.200.
Manita, Kiichi: *See*—
Kajimoto, Takeshi; Shimbo, Yutaka; Sato, Katsuyuki; Ogata, Masahiro; Kenmizaki, Kanehide; Kubono, Shouji; Kato, Nobuo; Manita, Kiichi; and Kanamitsu, Michitaro, 5,161,120, Cl. 365-189.050.
Mankovitz, Roy J. Apparatus and methods for providing text information identifying audio program selections. 5,161,251, Cl. 455-66.000.
Mannesmann Aktiengesellshaft: *See*—
Janich, Hans-Jurgen, 5,159,954, Cl. 137-557.000.
Mannesmann Rexroth GmbH: *See*—
Nikolaus, Heinrich, 5,159,812, Cl. 60-445.000.
Mannichi, Toshihiko; and Yamamoto, Toshifumi, to Kabushiki Kaisha Toshiba. Picture digitizing system using randomly varied binary threshold data. 5,161,036, Cl. 358-466.000.
Mansfield, Andrew: *See*—
Deugo, L. Scott; Mansfield, Andrew; Salzman, Michael; von Huene, Bernhard; and von Huene, Eberhard, 5,159,793, Cl. 52-126.100.
Manson, Paul R.: *See*—
Barron, Andrew R.; Cronin, Dennis F., Jr.; and Manson, Paul R., 5,159,983, Cl. 166-379.000.
Maracas, George N.: *See*—
Goronkin, Herbert; Zhu, X. Theodore; and Maracas, George N., 5,160,982, Cl. 257-23.000.
Marathon Oil Company: *See*—
Childers, Charles P., 5,160,036, Cl. 210-85.000.
Marceau, Stephen M., to Incom America, Inc. A Corp. of Texas. Computer carrying case. 5,160,001, Cl. 190-102.000.
Marcus, Bonita K.: *See*—
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 5,160,717, Cl. 423-704.000.
Marcus, Michael A., to Eastman Kodak Company. Acoustic flute web edge sensor. 5,161,126, Cl. 367-99.000.
Margaria, Mario, to Alplast SpA. Screw cap of thermoplastics material. 5,160,687, Cl. 264-271.100.
Marglin, Andrew J. Digital cue system for a motion picture projection system. 5,160,949, Cl. 352-92.000.
Marioni, Elio, to Askoll S.p.A. Filter for aquariums. 5,160,431, Cl. 210-169.000.
Marjoniemi, Kari: *See*—
Tammi, Pekka; and Marjoniemi, Kari, 5,160,410, Cl. 162-358.100.

Marler, David O.: *See—*
Chu, Pochen; Klocke, Donald J.; Marler, David O.; McWilliams, John P.; and Vartuli, James C., 5,160,500, Cl. 585-486.000.
Marlow, Ernest C.: *See—*
Walters, David L.; Healy, Martin; Marlow, Ernest C.; and Harrison, David F., 5,160,972, Cl. 356-32.000.
Marquis, Edward T.; Speranza, George P.; Sheu, Yu-Hwa E.; Culbreth, William K., III; and Pottratz, David G., to Texaco Chemical Company. Extractive distillation of propylene oxide. 5,160,587, Cl. 203-64.000.
Marritt, Clifford R.; Oakley, Francis R.; and Holmes, Gregory A., to R. J. Reynolds Tobacco Company. Method of and apparatus for delivering tobacco to a cigarette maker. 5,159,939, Cl. 131-84.200.
Marrow-Tech Incorporated: *See—*
Naughton, Gail K.; and Naughton, Brian A., 5,160,490, Cl. 435-284.000.
Marsh, Daniel F. Adjustable length tool box for automobile repair including a pivotal leg. 5,160,026, Cl. 206-373.000.
Marsh, John K.; and Welch, V. Richard, to Group Dekko International. Modular communication interconnection system. 5,160,276, Cl. 439-502.000.
Marshall, Frank P.: *See—*
Travor, Bruce W.; Marshall, Frank P.; and Kraynak, Timothy L., 5,160,800, Cl. 89-1.570.
Marshall, Perry C. Golf putting training device. 5,160,142, Cl. 273-186.200.
Marsoner, Hermann; and Ruther, Horst, to AVL Medical Instruments AG. Analyzing apparatus. 5,160,420, Cl. 204-433.000.
Marticou, Marc-Henri: *See—*
Legresy, Jean-Marc; and Marticou, Marc-Henri, 5,160,388, Cl. 148-552.000.
Martignoni, Fabrizio; Diazzi, Claudio; Pidutti, Albino; and Vio, Fabio, to SGS-Thomson Microelectronics S.r.l. Single-drive level shifter with low dynamic impedance. 5,160,854, Cl. 307-264.000.
Martino, Germain J.: *See—*
Juguin, Bernard A.; Boitiaux, Jean-Paul; and Martino, Germain J., 5,160,497, Cl. 568-798.000.
Marty, Christian: *See—*
Burkarth, Nadine; Marty, Christian; and Rappart, Yvan, 5,159,970, Cl. 164-517.000.
Maruman Golf Kabushiki Kaisha: *See—*
Katayama, Yutaka, 5,160,137, Cl. 273-77.00A.
Marumo, Mitsuji; Iwamoto, Kazunori; Mizusawa, Nobutoshi; Kariya, Takao; and Uzawa, Shunichi, to Canon Kabushiki Kaisha. Substrate holding device. 5,160,961, Cl. 355-53.000.
Marutsuka, Toshinori; and Hasegawa, Osamu, to Nisshinbo Industries, Inc. Stable Group VIII metallic colloidal dispersion. 5,160,452, Cl. 252-309.000.
Maruyama, Ryosuke: *See—*
Fujiwara, Shigeki; and Maruyama, Ryosuke, 5,160,877, Cl. 318-568.210.
Marzin, Jean-Yves: *See—*
Gerard, Jean-Michel; and Marzin, Jean-Yves, 5,160,992, Cl. 359-326.000.
Maschinenfabrik Goebel GmbH: *See—*
Thomas, Hermann; and Herd, Josef, 5,159,868, Cl. 83-674.000.
Maschinenfabrik Rieter AG: *See—*
Oehler, Reinhard; Meyer, Urs; and Bischofberger, Jurg, 5,161,111, Cl. 364-470.000.
Massachusetts Institute of Technology: *See—*
Chen, Chenson K., 5,160,575, Cl. 156-620.700.
Colton, Jonathan S.; and Suh, Nam P., 5,160,674, Cl. 264-50.000.
Everett, Patrick N.; Delaney, William F.; and Griswold, Marsden P., 5,160,959, Cl. 355-53.000.
Monta, Peter A.; Lim, Jae S.; and Parulski, Kenneth A., 5,161,006, Cl. 358-31.000.
Swanson, Gary J.; and Veldkamp, Wilfrid B., 5,161,059, Cl. 359-565.000.
Masuda, Akira: *See—*
Hakkaku, Kunio; Tomoda, Susumu; Morita, Satosi; Masuda, Akira; and Odagiri, Sinji, 5,161,038, Cl. 358-496.000.
Masuda, Kazuhito: *See—*
Hirane, Hideo; Tanno, Kiyohiko; and Masuda, Kazuhito, 5,160,837, Cl. 250-208.200.
Masuda, Norio: *See—*
Harada, Takashi; Hatakeyama, Ken-ichi; Masuda, Norio; Fujihara, Noboru; and Inomata, Masayuki, 5,160,806, Cl. 174-35.0GC.
Masui, Kenji: *See—*
Nomura, Masaki; Koike, Shin; Yamashita, Ko; Okisaka, Koichi; Sano, Yoshito; Omura, Hisao; Irinatsu, Yuuichi; Masui, Kenji; and Yasumasu, Takeshi, 5,160,759, Cl. 426-602.000.
Masuyama, Araki: *See—*
Okahara, Mitsuo; and Masuyama, Araki, 5,160,450, Cl. 252-174.210.
Matec Holding AG: *See—*
Lucca, Eusebio; and Gillard, Paul H., 5,160,406, Cl. 156-62.400.
Mateika, Dieter; and Volkel, Erich, to U.S. Philips Corporation. Method of growing mixed crystals from melts of oxidic multicomponent systems. 5,160,401, Cl. 156-600.000.
Mathur, Rajiv: *See—*
Wallach, Donald F. H.; and Mathur, Rajiv, 5,160,669, Cl. 264-4.300.
Matrick, Howard, to Du Pont de Nemours, E. I., and Company. Aqueous ink jet inks containing ester diol and amide diol cosolvents. 5,160,372, Cl. 106-19.00R.
Matsuda, Eichika; Murata, Kaoru; and Okuda, Yoshihiro, to Sharp Kabushiki Kaisha. Hand held data processing apparatus. 5,161,118, Cl. 364-744.000.
Matsugu, Masakazu: *See—*
Saitoh, Kenji; Matsugu, Masakazu; and Abe, Naoto, 5,160,848, Cl. 250-548.000.
Matsuguchi, Masanobu: *See—*
Sakai, Yoshirou; Sadaoka, Yoshihiko; Matsuguchi, Masanobu; Kuroiwa, Takaaki; and Abe, Tooru, 5,161,085, Cl. 361-286.000.
Matsui, Hiroshi, to Canon Kabushiki Kaisha. Focusing screen. 5,161,058, Cl. 359-574.000.
Matsumoto, Kuniaki: *See—*
Kosaka, Michitaka; Sasaki, Toshiro; Matsumoto, Kuniaki; Akashi, Kichizo; and Suemitsu, Satoru, 5,161,103, Cl. 364-408.000.
Matsumoto, Tatsuyoshi: *See—*
Saito, Kimitaka; Matsumoto, Tatsuyoshi; and Igashira, Toshihiko, 5,159,915, Cl. 123-557.000.
Matsumoto, Toshiaki: *See—*
Takaichi, Akihisa; Okamoto, Toshihiko; and Matsumoto, Toshiaki, 5,160,728, Cl. 424-44.000.
Matsunaga, Osamu, to Sony Corporation. Noise reduction system for color television signal. 5,161,018, Cl. 358-167.000.
Matsuo, Makoto; Utsumi, Minoru; Ogusu, Chihaya; Mukasa, Shunsuke; Kudo, Yoshiaki; Obata, Hiroyuki; Aono, Takashi; Mohri, Hiroshi; Koike, Masato; Amano, Hideaki; and Saito, Norikazu, to Dai Nippon Printing Co., Ltd. Method for recording and reproducing information, apparatus therefor and recording medium. 5,161,233, Cl. 355-218.000.
Matsuo, Shunji: *See—*
Haneda, Satoshi; Morita, Shizuo; Fukuchi, Masakazu; and Matsuo, Shunji, 5,160,963, Cl. 355-200.000.
Matsuo, Takayuki: *See—*
Ono, Michio; Kume, Masaharu; and Matsuo, Takayuki, 5,160,780, Cl. 428-220.000.
Matsuoka, Hiroshi: *See—*
Nakanishi, Yasuyuki; and Matsuoka, Hiroshi, 5,160,301, Cl. 474-263.000.
Matsushita Electric Industrial Co., Inc.: *See—*
Odanaka, Shinji, 5,160,996, Cl. 257-375.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Ai, Takaharu, 5,161,072, Cl. 360-53.000.
Fukushima, Yoshihisa; Satoh, Isao; Takagi, Yuji; Azumatani, Yasushi; and Hamasaka, Hiroshi, 5,161,143, Cl. 369-53.000.
Hori, Yoshikazu; Yamamoto, Hiroaki; and Sogawa, Fumihiro, 5,161,148, Cl. 369-112.000.
Ishida, Takashi; O'Hara, Shunji; Ishibashi, Kenzo; and Satoh, Toshio, 5,161,243, Cl. 369-44.250.
Kajita, Harumasa; Yanagimichi, Toyokazu; Kariya, Tetsuo; Wakabayashi, Toshikazu; Kawashima, Ichiro; Nakanami, Satoshi; and Tanaka, Masami, 5,161,187, Cl. 380-15.000.
Kanai, Toshio, 5,161,241, Cl. 363-65.000.
Murata, Jun; Sunohara, Masaaki; and Kimoto, Takayuki, 5,160,361, Cl. 65-102.000.
Ohshima, Mineo; and Fujikawa, Akinobu, 5,161,079, Cl. 360-132.000.
Takahashi, Hideki; Tani, Shigemitsu; Fukano, Akira; Katakura, Kazuto; Makimoto, Hitoshi; and Watanabe, Yoshikazu, 5,160,964, Cl. 355-200.000.
Tomii, Kaoru; and Kaneko, Akira, 5,160,871, Cl. 315-366.000.
Tukiyama, Yasutaka; Itami, Tadashi; Okada, Yosuhiro; and Hamamoto, Syougo, 5,160,873, Cl. 318-254.000.
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Micron Technology, Inc.: *See—*
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Miller, Eric A., to TigerMark. Display panel backlighting system. 5,160,195, Cl. 362-300.000.
Miller, Robert H., to Nu-Zip Dee Mfg., Inc. Protective foot device for mounting on furniture. 5,160,105, Cl. 248-188.900.
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Whitt, Riley S.; Bridges, William L.; and Johnson, Marshall L., 5,159,734, Cl. 15-883.000.
Milliman, Keith L., to Crosman Corporation. Gun with pivoting barrel, rotary ammunition cylinder, and double action firing mechanism. 5,160,795, Cl. 42-65.000.
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Heinecke, Steven B.; and Peterson, Donald G., 5,160,315, Cl. 602-57.000.
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Omata, Yasukini; and Osamura, Yoshinori, 5,160,942, Cl. 346-76.0PH.
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Mitsubishi Deni Kabushiki Kaisha: *See—*
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Miyake, Hiroyuki, to Fuji Xerox Co., Ltd. Image sensor including a plurality of light-receiving arrays and method of driving the same. 5,160,836, Cl. 250-208.100.
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Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, to Ricoh Company, Ltd. Image forming apparatus having a separate black developer stored for a color image. 5,160,969, Cl. 355-326.000.
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Avidan, Amos A., 5,160,426, Cl. 208-113.000.
Cardis, Angeline B.; and Shanholtz, Carl E., 5,160,349, Cl. 44-331.000.
Cardis, Angeline B.; Goyal, Arjun K.; Shanholtz, Carl E.; and Wiszniewski, Virginia C., 5,160,649, Cl. 252-47.500.
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Mayer, Daniel W.; and Neiss, Robert L., 5,159,829, Cl. 73-38.000.
Moest, Thomas; and Pich, Claus H., to Nordmark Arzneimittel GmbH. Manufacture of pellets of xanthine derivatives. 5,160,469, Cl. 264-117.000.
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Kopf-Sill, Anne R.; and Zuk, Robert, 5,160,702, Cl. 422-72.000.
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Molthen, Robert M. Plant support stand. 5,159,780, Cl. 47-70.000.
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Starrett, Paul D., 5,160,140, Cl. 273-84.00R.
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Mistyurik, John D., 5,160,205, Cl. 400-248.000.
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Pepper, Robert, 5,160,095, Cl. 241-46.060.
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Mortillo, Anthony J.; Cochran, Danny B.; and Micale, Anthony J., Jr., 5,159,896, Cl. 119-50.500.
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Moore, Charles A.; Kowansky, Am; Flood, Robert W.; and Caveney, L. Patrick, to NCR Corporation. Method of assembly of a motion transmission apparatus. 5,160,300, Cl. 474-257.000.
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Maloney, James R.; and Moore, Joseph C., 5,160,545, Cl. 118-725.000.
Moore, Kevin D.; Stafford, John W.; Beckenbaugh, William M.; and Cholewczynski, Ken, to Motorola, Inc. Solder plate reflow method for forming a solder bump on a circuit trace intersection. 5,160,409, Cl. 156-656.000.
Moore, William G.: *See*—
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Moorehead, Harvey R.: *See*—
Nichols, Colin J.; Nordgren, Gregory N.; and Moorehead, Harvey R., 5,160,325, Cl. 604-247.000.
Moran, David; and Morris, Octavius J., to U.S. Philips Corporation. Processing picture signals. 5,161,205, Cl. 382-56.000.
Moran, Thomas F., Jr., to Midwest Plastic Fabricators. Method for bending pipe. 5,160,685, Cl. 264-237.000.
Moreau, Alain; and Baudin, Florent. Tent with frame formed by hoops. 5,159,948, Cl. 135-104.000.
Mori, Akio: *See*—
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Mori, Kiyoshi, to Texas Instruments Incorporated. Method of making a vertical MOS transistor. 5,160,491, Cl. 437-40.000.
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Morishita, Yoshii; Sugimoto, Yasushi; Hayashida, Shigeru; Ishikawa, Hiroko; Noda, Yoshiaki; Murakami, Shigeru; Sato, Munehiro; Saito, Yoshinori; Kurata, Naoji; and Sugita, Yoshio, to Hitachi Chemical Company, Ltd. Electrophotographic member. 5,160,487, Cl. 430-59.000.
Morita, Kiyoo, to Fuji Photo Film Co., Ltd. Magnetic tape cassette accommodating case. 5,160,028, Cl. 206-387.000.
Morita, Satosi: *See*—
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Haneda, Satoshi; Morita, Shizuo; Fukuchi, Masakazu; and Matsuo, Shunji, 5,160,963, Cl. 355-200.000.
Morita, Tetsuo, to Brother Kogyo Kabushiki Kaisha. Automatic sewing machine capable of fast jump stitching. 5,159,888, Cl. 112-121.120.
Moriyama, Keiji, to Nikon Corporation. Multidirectional divided-pupil focus detecting apparatus. 5,160,834, Cl. 250-201.800.
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Morris, Darryl C.: *See*—
Gupta, Shanti S.; and Morris, Darryl C., 5,161,191, Cl. 380-37.000.
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Ash, Kenneth C.; Crocker, William A.; Haygarth, John C.; Lee, David R.; Morris, Donald; Peterson, John R.; Riesen, Jon A.; and Yih, Robert S., 5,160,482, Cl. 423-75.000.
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Verdier, Michel; and Mortgat, Regis, 5,160,697, Cl. 376-352.000.
Mortillo, Anthony J.; Cochran, Danny B.; and Micale, Anthony J., Jr., to Monsanto Company. Poultry nest pad. 5,159,896, Cl. 119-50.500.

Morton International, Inc.: *See*—
Lund, Gary K.; and Stevens, Mikel R., 5,160,386, Cl. 149-88.000.
Moscovitch, Jerry, to EDI Industries Ltd. Skicase and cooperating holders. 5,160,075, Cl. 224-328.000.
Moscrip, William M., to United States of America, Navy. Prestressed composite gun tube. 5,160,802, Cl. 89-16.000.
Motorola, Inc.: *See*—
Bertiger, Bary R.; Leopold, Raymond J.; and Peterson, Kenneth M., 5,161,248, Cl. 455-17.000.
Black, Gregory R., 5,160,898, Cl. 330-284.000.
Bray, Michelle M.; Bright, Michael W.; and Sowa, Hans C., 5,161,189, Cl. 380-21.000.
Cottingham, David J.; Petrites, Michael J.; and Tischhauser, Thomas J., 5,159,751, Cl. 29-832.000.
Diaz, Rafael J.; and Grube, Gary W., 5,161,154, Cl. 370-95.100.
Goronkin, Herbert; Zhu, X. Theodore; and Maracas, George N., 5,160,982, Cl. 257-23.000.
Hoang, Truc G., 5,160,905, Cl. 333-204.000.
Moore, Kevin D.; Stafford, John W.; Beckenbaugh, William M.; and Cholewczynski, Ken, 5,160,409, Cl. 156-656.000.
Parker, Lanny L.; Atriss, Ahmad H.; and Mueller, Dean W., 5,161,175, Cl. 377-70.000.
Siomkos, John R.; and Huang, Philip M., 5,160,906, Cl. 333-204.000.
Torkington, Richard S.; and Lamoreaux, David G., 5,160,903, Cl. 333-12.000.
Westwick, Alan L., 5,160,894, Cl. 328-14.000.
Motoyama, Hatsuo: *See*—
Saeki, Hiroshi; and Motoyama, Hatsuo, 5,160,902, Cl. 331-117.00R.
Motoyama, Takushi, to Fujitsu Limited. Method of removing a patterned multilevel resist from a surface layer on a substrate. 5,160,404, Cl. 156-643.000.
Mouri, Naoki; Hirao, Kouji; and Aoyama, Mutsuro, to Aisin Seiki Kabushiki Kaisha. Shock absorber producing variable damping force. 5,160,162, Cl. 280-707.000.
Moyer, Randall S. Safety hunter's garment. 5,159,718, Cl. 2-69.000.
MSP Corporation: *See*—
Liu, Benjamin Y. H., 5,160,664, Cl. 252-305.000.
MTS Systems Corporation: *See*—
Holbrook, James D., 5,160,750, Cl. 425-451.900.
Mueller, Dean W.: *See*—
Parker, Lanny L.; Atriss, Ahmad H.; and Mueller, Dean W., 5,161,175, Cl. 377-70.000.
Mugnier, Jean-Francois, to Pomagalski S.A. Cable transport installation with cars driven by friction. 5,159,880, Cl. 104-87.000.
Mukasa, Shunsuke: *See*—
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Mullen, John J.: *See*—
Addink, Marvin; Hu, Cheney Y.; Leyba, Todd; Mullen, John J.; Till, Carolyn A.; and Holmes, Andrew W., 5,161,214, Cl. 395-145.000.
Mullen, William H., to Cambridge Life Sciences plc. Enzyme electrodes and improvements in the manufacture thereof. 5,160,418, Cl. 204-153.120.
Mullins, Malcolm H.; and Latham, Frank, to M.K. Electric Limited. Circuit breaker actuating device. 5,160,908, Cl. 335-68.000.
Muntean, George L.: *See*—
Williams, John C.; Westerson, Kevin W.; Muntean, George L.; and Sullivan, Thomas W., 5,159,911, Cl. 123-467.000.
Munz, Wolf-Dieter: *See*—
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Murai Co., Ltd.: *See*—
Hyoi, Isso, 5,160,947, Cl. 351-124.000.
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Murakami, Shigeru: *See*—
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Murakami, Takashi; Kageyama, Shigeki; and Mizuguchi, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser producing visible light. 5,161,167, Cl. 372-46.000.
Murakami, Tokumichi; Kamizawa, Koh; Kinjo, Naoto; Ohira, Hideo; and Wakabayashi, Takao, to Mitsubishi Denki Kabushiki Kaisha. Digital signal processor matching data blocks against a reference block and replacing the reference block when a new minimum distortion block is calculated. 5,161,247, Cl. 395-800.000.
Muramatsu, Kiyoji, to Brother Kogyo Kabushiki Kaisha. Digital image processing device for enlarging original image with high fidelity. 5,161,035, Cl. 358-451.000.
Muramoto, Tomotaka; Takahashi, Hirokazu; Horii, Hiroyuki; and Hori, Masashi, to Canon Kabushiki Kaisha. Audio signal recording apparatus. 5,161,070, Cl. 360-8.000.
Murata, Jun; Sunohara, Masaaki; and Kimoto, Takayuki, to Matsushita Electric Industrial Co., Ltd. Method of manufacturing optical element. 5,160,361, Cl. 65-102.000.
Murata, Kaoru: *See*—
Matsuda, Eichika; Murata, Kaoru; and Okuda, Yoshihiro, 5,161,118, Cl. 364-744.000.
Murata Kikai Kabushiki Kaisha: *See*—
Mori, Shigeki; and Mikami, Kazuhiko, 5,159,806, Cl. 57-328.000.
Murata Mfg. Col, Ltd.: *See*—
Kenji, Naitou; Yasuhiro, Ohshima; and Tadao, Nagai, 5,160,872, Cl. 315-411.000.
Murata Manufacturing Co., Ltd.: *See*—
Hamuro, Mitsuro; and Konishi, Toru, 5,160,066, Cl. 221-172.000.
Senda, Atsuo; Nakagawa, Takuji; and Takano, Yoshihiko, 5,160,373, Cl. 106-1.290.
Murphy, Guy R. Unit to enhance heat transfer through heat exchanger tube. 5,159,975, Cl. 165-110.000.
Murphy, John Q., to Foster Wheeler Energy Corporation. Tube fin trimming machine and method for use. 5,160,549, Cl. 148-201.000.
Murphy, Martin M.: *See*—
Falou, Mohamad S.; Finch, Timothy D.; Garner-Gray, Peter F.; Hight, Andrew T.; Murphy, Martin M.; Newbold, Geoffrey; Niven, Ian E.; and Savill, Derek G., 5,160,654, Cl. 252-91.000.
Murray, Charles M.; Thompson, Joel L.; and Hentz, Lawrence H., Jr., to Washington Suburban Sanitary Commission. Methods of and apparatus for removing odors from process airstreams. 5,160,707, Cl. 422-170.000.
Murray, Peter, to C. A. Wieidmuller GmbH & Co. Separable contact arrangement. 5,160,285, Cl. 439-801.000.
Musacchia, John, Sr. Broadhead arrowhead. 5,160,148, Cl. 273-422.000.
Muth, Ross R.: *See*—
Gravener, Roy D.; and Muth, Ross R., 5,160,677, Cl. 264-101.000.
Gravener, Roy D.; and Muth, Ross R., 5,160,678, Cl. 264-101.000.
Muto, Shunichi: *See*—
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Mydlack, Thomas L.: *See*—
Harris, Kevin M.; and Mydlack, Thomas L., 5,160,536, Cl. 106-19.00R.
Myrbostad, Erling; and Venas, Karl, to Norsk Hydro a.s. Method for grain refining of metals. 5,160,533, Cl. 75-10.450.
Nabo, Olle: *See*—
Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nabo, Olle, 5,160,311, Cl. 494-56.000.
Nadaud, Patrick: *See*—
Fulchiron, Noel; Naillon, Bernard; and Nadaud, Patrick, 5,160,803, Cl. 102-363.000.
Nafziger, Steven; and McMennamy, John A., to Westinghouse Electric Corp. Check valve testing system. 5,159,835, Cl. 73-584.000.
Nagai, Atsushi: *See*—
Ishii, Kanji; and Nagai, Atsushi, 5,160,916, Cl. 340-629.000.
Nagai, Yasuo; and Yoshihiro, Mitsugu, to Sony Corporation. Servo control device for a VTR. 5,161,209, Cl. 388-907.500.
Nagai, Yutaka: *See*—
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Nagamitsu, Tatsuo: *See*—
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Nagano, Kazuhiko: *See*—
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Nagano, Tetsuaki, to Mitsubishi Denki K.K. Induction motor controller providing temperature compensation. 5,160,878, Cl. 318-800.000.
Nagasaki, Yoshimi; Hashimoto, Takao; Takemura, Isao; Imai, Hiroshi; Hirama, Yasunobu; and Nakajima, Tadayoshi, to Ajinomoto Co., Inc. Method for treatment of waste water by activated sludge process. 5,160,621, Cl. 210-614.000.
Nagasawa, Keizo: *See*—
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Nagatsuna, Shinju: *See*—
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Naito, Hisatsugu; and Asano, Shinya, to Canon Kabushiki Kaisha. Ribbon adapter and ribbon cassette capable of mounting the ribbon adapter and recording apparatus. 5,160,204, Cl. 400-208.000.
Najjar, Mitri S.; and Hilmar, Martin D., to Texaco Inc. Method of forming membranes useful for separation of gases. 5,160,352, Cl. 55-16.000.
Nakagaki, Shintaro: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Koyama, Yoshihisa; and Uchiyama, Yuji, 5,161,007, Cl. 358-43.000.

Nakagawa, Kenichi: *See*—
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Nakagawa, Satoshi: *See*—
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Nakagawa, Takuji: *See*—
Senda, Atsuo; Nakagawa, Takuji; and Takano, Yoshihiko, 5,160,373, Cl. 106-1.290.
Nakahara, Yoshihiko, to Kyodo Printing Co., Ltd. Magnetic recording medium having authenticating poles at its edge. 5,160,833, Cl. 235-449.000.
Nakahata, Hideaki; and Fujimori, Naoji, to Sumitomo Electric Industries Ltd. Surface acoustic wave device. 5,160,869, Cl. 310-313.00A.
Nakai, Mikio, to Polyplastics Co. Ltd. Resin material for inserting lead frame and molded component thereof. 5,160,786, Cl. 428-323.000.
Nakai, Takamasa: *See*—
Gaku, Morio; Ishii, Kenzi; and Nakai, Takamasa, 5,160,787, Cl. 428-333.000.
Nakajima, Tadayoshi: *See*—
Nagasaki, Yoshimi; Hashimoto, Takao; Takemura, Isao; Imai, Hiroshi; Hirama, Yasunobu; and Nakajima, Tadayoshi, 5,160,621, Cl. 210-614.000.
Nakajima, Yasuharu; and Inoue, Akira, to Mitsubishi Denki Kabushiki Kaisha. Multiple layer semiconductor circuit module. 5,160,907, Cl. 333-246.000.
Nakama, Kenichi: *See*—
Seki, Masafumi; Hashizume, Hideki; Nakama, Kenichi; and Kobayashi, Shigeru, 5,160,360, Cl. 65-30.130.
Nakamura, Akira, to Rohm Co., Ltd. Reading circuit used for floppy disk unit. 5,161,071, Cl. 360-46.000.
Nakamura, Eiichi; Tanaka, Hiroaki; Tanaka, Yoshiharu; Iitake, Takashi; and Hoshikawa, Hiroshi, to Fuji Electric Co., Ltd.; and Public Works Research Institute. Toxic substance-detecting system with fixed microorganism membrane for water quality-monitoring. 5,160,604, Cl. 210-85.000.
Nakamura, Hisashi: *See*—
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Nakamura, Masaru; Uekido, Kouzou; and Ukai, Tsunekazu, to Hirose Electric Co., Ltd. Electrical connector for circuit boards. 5,160,275, Cl. 439-328.000.
Nakamura, Miki, to Zexel Corporation. Receiver tank. 5,159,821, Cl. 62-509.000.
Nakamura, Mitsuki: *See*—
Shiraishi, Motoatsu; Nagamitsu, Tatsuo; and Nakamura, Mitsuki, 5,159,827, Cl. 72-405.000.
Nakamura, Toshio: *See*—
Sasaki, Yutaka; Kiyomiya, Yutaka; Nakamura, Toshio; Mori, Kunio; and Morii, Akimitsu, 5,160,721, Cl. 423-376.000.
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Nakanami, Satoshi: *See*—
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Nakanishi, Yasuyuki; and Matsuoka, Hiroshi, to Bando Chemical Industries, Ltd. Fiber-reinforced rubber. 5,160,301, Cl. 474-263.000.
Nakano, Haruo; and Sota, Koichi, to Otari, Inc. Tape loading device into cassette. 5,160,571, Cl. 156-505.000.
Nakao, Souichiro, to Fuji Photo Film Co., Ltd. Optical/electrical view finder. 5,161,025, Cl. 358-224.000.
Nakata, Shigeru: *See*—
Takagi, Yukihito; Imamaki, Teruo; Nakata, Shigeru; and Sakuma, Mikio, 5,160,573, Cl. 156-510.000.
Nakatani, Yoshinori: *See*—
Honda, Michitaka; and Nakatani, Yoshinori, 5,161,178, Cl. 378-99.000.
Nakatsuji, Tadao: *See*—
Yoshimoto, Masafumi; Nakatsuji, Tadao; Nagano, Kazuhiko; and Tatsu, Tetsuo, 5,160,586, Cl. 204-59.00R.
Nakayama, Junichiro; Kimura, Kazuhiro; Katayama, Hiroyuki; and Ohta, Kenji, to Sharp Kabushiki Kaisha. Optical memory device and apparatus for manufacturing the same. 5,160,572, Cl. 156-510.000.
Nakayama, Masaaki: *See*—
Arai, Tatsuo; Nakayama, Masaaki; and Saito, Takayoshi, 5,160,228, Cl. 407-32.000.
Nakayama, Satoshi; and Hieda, Teruo, to Canon Kabushiki Kaisha. Video signal processing apparatus for synthesizing video signal with multiple color pattern signal. 5,161,236, Cl. 358-22.000.
Nakayama, Susumu: *See*—
Hojo, Toshiyuki; Tokusa, Kenji; Oguni, Kensaku; and Nakayama, Susumu, 5,159,817, Cl. 62-81.000.
Takahashi, Mineo; Nakayama, Susumu; Suzuki, Satoshi; Mori, Akio; Seo, Hiroyuki; Imamura, Minoru; Tanaka, Hiroshi; and Yoneyama, Norihiro, 5,160,812, Cl. 174-135.000.
Nakura, Makoto: *See*—
Ohshima, Minoru; Morio, Shuichi; Saitoh, Susumu; Namikawa, Osamu; Obara, Kazutoshi; Seino, Minoru; Mochizuki, Takeshi; Nakura, Makoto; Arimoto, Akira; and Kasai, Masuo, 5,161,046, Cl. 359-212.000.
Nalco Chemical Company: *See*—
Kleefisch, Jeffery L.; and Spaeth, Vincent G., 5,160,632, Cl. 210-724.000.
Lewis, Vincent E., 5,160,425, Cl. 208-95.000.
McCarthy, Robert E., 5,160,047, Cl. 210-749.000.
Nalesnik, Theodore E.; and Kapuscinski, Maria M., to Texaco Inc. Dispersant, VI improver and antioxidant additive, and lubricating oil composition containing same. 5,160,446, Cl. 252-51.50A.
Namba, Kenryo; Shinkai, Masahiro; Tezuka, Sinichi; Inoue, Tetsuhi; Aoi, Toshiki; and Takayama, Suguru, to TDK Corporation. Optical recording medium. 5,161,150, Cl. 369-275.400.
Namikawa, Osamu: *See*—
Ohshima, Minoru; Morio, Shuichi; Saitoh, Susumu; Namikawa, Osamu; Obara, Kazutoshi; Seino, Minoru; Mochizuki, Takeshi; Nakura, Makoto; Arimoto, Akira; and Kasai, Masuo, 5,161,046, Cl. 359-212.000.
Namura, Koji: *See*—
Fukumoto, Hiroshi; Namura, Koji; Nakamura, Hisashi; Fukazawa, Keiichi; and Naruki, Kenichi, 5,160,944, Cl. 346-76.0PH.
Nanevicz, Joseph E.: *See*—
Frederickson, Arthur R.; Nanevicz, Joseph E.; Thayer, Jeffrey S.; and Parkinson, Dean B., 5,160,374, Cl. 106-401.000.
Nanni, Edward J.: *See*—
Becraft, Lloyd G.; and Nanni, Edward J., 5,160,602, Cl. 208-131.000.
Naoi, Yasushi; Kobayashi, Kenichi; Ota, Harutoshi; and Kuribayashi, Yasushi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha; and Johan Seisakusho Co., Ltd. Parking-brake operating device. 5,159,850, Cl. 74-523.000.
Nara, Hitoshi: *See*—
Tomiyama, Takamichi; Nara, Hitoshi; and Adachi, Osamu, 5,161,067, Cl. 359-824.000.
Narayanan, G. Hari; and Quist, William E., to Boeing Company, The. Aluminum-lithium alloy article. 5,160,555, Cl. 148-417.000.
Narayanan, Kolazi S.: *See*—
Chaudhuri, Ratan K.; Narayanan, Kolazi S.; and Dahanayake, Manilal, 5,160,528, Cl. 71-79.000.
Narayanan, Venkatesh: *See*—
Hutcheson, Timothy L.; Or, Wilson; Narayanan, Venkatesh; Mohan, Subramaniam; Wohlmut, Peter G.; Srinivasan, Ramanujam; Hunt, Bobby R.; and Ryan, Thomas W., 5,161,204, Cl. 382-16.000.
Naruki, Kenichi: *See*—
Fukumoto, Hiroshi; Namura, Koji; Nakamura, Hisashi; Fukazawa, Keiichi; and Naruki, Kenichi, 5,160,944, Cl. 346-76.0PH.
Narutaki, Yozo; and Nakagawa, Kenichi, to Sharp Kabushiki Kaisha. Method of forming liquid crystal display device with molybdenum shading layer over ITO electrodes. 5,161,043, Cl. 359-54.000.
Narvanen, Ale: *See*—
Tuunanen, Jukka; Narvanen, Ale; and Geysen, Mario, 5,160,378, Cl. 134-25.100.
Nasu, Takeshi: *See*—
Sugiura, Kiyohiko; Miki, Nobuaki; Nasu, Takeshi; Sugiura, Masayuki; and Saito, Masao, 5,160,116, Cl. 251-129.140.
National Research Development Corporation: *See*—
Allan, Peter S.; and Bevis, Michael J., 5,160,466, Cl. 264-69.000.
Ward, Ian M.; Woods, Denis W.; and Busfield, Walter K., 5,160,464, Cl. 264-22.000.
National Semiconductor Corporation: *See*—
Dutta, Vivek B.; Demmin, Jeffrey C.; Diorio, Mark L.; and Ewanich, Jon T., 5,159,750, Cl. 29-827.000.
Wendell, Dennis L., 5,160,859, Cl. 307-475.000.
National Starch and Chemical Investment Holding Corporation: *See*—
Thaler, Martin D.; Giese, Robert W.; Puletti, Paul; and Schmidt, Robert, 5,160,686, Cl. 264-255.000.
National Tsing Hua University: *See*—
Tan, Chung-Sung, 5,160,044, Cl. 210-634.000.
Naughton, Brian A.: *See*—
Naughton, Gail K.; and Naughton, Brian A., 5,160,490, Cl. 435-284.000.
Naughton, Gail K.; and Naughton, Brian A., to Marrow-Tech Incorporated. Three-dimensional cell and tissue culture apparatus. 5,160,490, Cl. 435-284.000.
Nawata, Shinichi: *See*—
Ijyuin, Makoto; Tsuda, Akihiko; and Nawata, Shinichi, 5,160,476, Cl. 264-563.000.
Nazarathy, Moshe; Berger, Josef; and Kagan, Yishai, to Harmonic Lightwaves, Inc. Optical transmitters linearized by means of parametric feedback. 5,161,044, Cl. 359-157.000.
NCR Corporation: *See*—
Moore, Charles A.; Kowansky, Ann; Flood, Robert W.; and Caveney, L. Patrick, 5,160,300, Cl. 474-257.000.
Newman, Lee A., 5,161,096, Cl. 363-49.000.
NDM Acquisition Corp.: *See*—
Cartmell, James V.; and Sturtevant, Wayne R., 5,160,328, Cl. 604-307.000.
Neale, Michael E., to Environmental Systems (International) Ltd. Electrolytic process for treatment of photographic wastewater effluent. 5,160,417, Cl. 204-130.000.
NEC Corporation: *See*—
Harada, Takashi; Hatakeyama, Ken-ichi; Masuda, Norio; Fujihara, Noboru; and Inomata, Masayuki, 5,160,806, Cl. 174-35.0GC.
Sawata, Hisashi, 5,161,141, Cl. 369-44.250.
Shimawaki, Hidenori, 5,160,994, Cl. 257-190.000.
Sugawara, Akihiko; and Takahashi, Yoshihito, 5,160,923, Cl. 340-825.510.
Ujiie, Mikio, 5,161,194, Cl. 380-48.000.
Neiss, Robert L.: *See*—
Mayer, Daniel W.; and Neiss, Robert L., 5,159,829, Cl. 73-38.000.

Nelson, John L.; and Houldey, David, to CPC International Inc. Aspiration unit for conditioning air during rail car unloading of perishable food products. 5,160,515, Cl. 55-267.000.

Nemoto, Yousui; Itoh, Akiyoshi; Kohmura, Toshimi; and Horiba, Yasuhiro, to Mitsubishi Petrochemical Co., Ltd. Epoxy resin-impregnated glass cloth sheet having adhesive layer. 5,160,783, Cl. 428-261.000.

Neri, Michael A., to DeGeorge, Joseph R.; and Every, William J. Method for producing biodegradable packaging material. 5,160,467, Cl. 264-101.000.

Nestork, William J.: *See*—
Pricer, Wilber D.; Faure, Thomas B.; Meyerson, Bernard S.; Nestork, William J.; and Turnbull, John R., Jr., 5,160,987, Cl. 257-307.000.

Neuber, Hans-Ulrich: *See*—
Lindner, Wolfgang; Neuber, Hans-Ulrich; and Taschenbrecker, Erich, 5,160,666, Cl. 252-402.000.

Neuristics, Inc.: *See*—
Hutcheson, Timothy L.; Or, Wilson; Narayanan, Venkatesh; Mohan, Subramaniam; Wohlmut, Peter G.; Srinivasan, Ramanujam; Hunt, Bobby R.; and Ryan, Thomas W., 5,161,204, Cl. 382-16.000.

Neuwirth, Robert S.; and Bolduc, Lee R., to Gynelab, Inc. Cauterizing apparatus and method for laparoscopic cholecystostomy, gallbladder ablation and treatment of benign prostate hypertrophy. 5,159,925, Cl. 128-401.000.

New Venture Gear, Inc.: *See*—
Williams, Randolph C.; and Bouchard, Arthur, II, 5,159,847, Cl. 74-337.500.

Newbold, David D.; and Colton, Raymond H., to Bend Research, Inc. Sweep valve for dehydration valve. 5,160,514, Cl. 55-158.000.

Newbold, Geoffrey: *See*—
Falou, Mohamad S.; Finch, Timothy D.; Garner-Gray, Peter F.; Hight, Andrew T.; Murphy, Martin M.; Newbold, Geoffrey; Niven, Ian E.; and Savill, Derek G., 5,160,654, Cl. 252-91.000.

Newell, Robert L., to Andor Brush Company. Brush construction. 5,159,736, Cl. 15-195.000.

Newman, Lee A., to NCR Corporation. Method and circuit to quickly start a negative switching voltage regulator. 5,161,096, Cl. 363-49.000.

Newsome, Reginald W.: *See*—
Adams, John M.; Chance, Christopher N.; DeBlasio, James A.; Evers, Donald H.; Harris, William C., Jr.; Kirby, Michael A., Sr.; Newsome, Reginald W.; Pham, Xuan M.; and Talley, Robert E., 5,160,023, Cl. 206-256.000.

NGK Insulators, Ltd.: *See*—
Misawa, Hidenobu, 5,160,684, Cl. 264-173.000.

NGK Spark Plug Co., Ltd.: *See*—
Sawada, Toshiki; Yamano, Masaru; Kazuo, Taguchi; Kojima, Takao; Ishiguro, Hiroyuki; and Yamada, Masahiko, 5,160,598, Cl. 204-429.000.

Nichols, Colin J.; Nordgren, Gregory N.; and Moorehead, Harvey R., to C. R. Bard, Inc. Catheter with novel lumens shapes. 5,160,325, Cl. 604-247.000.

Nichols, Steven P.: *See*—
Bell, Ronald D.; Gardiner, William C.; Howell, John R.; Matthews, Ronald D.; and Nichols, Steven P., 5,160,254, Cl. 431-7.000.

Nicholson, James O.; O'Quin, John C., III; O'Quin, John T., II; and Strieteimeier, Frederick E., to International Business Machines Corporation. Computer system with input/output cache. 5,161,219, Cl. 395-425.000.

Niemann, Ronald G.: *See*—
Gilbert, Paul H.; Niemann, Ronald G.; and Trapp, Robert L., 5,161,170, Cl. 375-98.000.

Niemela, Paul W., to Ryobi Motor Products Corp. Motor field assembly. 5,160,867, Cl. 310-154.000.

Niesen, Lawrence J. Laboratory scale ultrafiltration apparatus. 5,160,433, Cl. 210-321.840.

Nieskens, Martin J. P. C.: *See*—
Khouw, Frank H. H.; Spiessens, Marinus J.; Nieskens, Martin J. P. C.; and Woudstra, Jouke J., 5,160,706, Cl. 422-140.000.

Nihls, Bradley J.; and Nihls, Kathryn M. Shutter actuating apparatus. 5,160,955, Cl. 354-269.000.

Nihls, Kathryn M.: *See*—
Nihls, Bradley J.; and Nihls, Kathryn M., 5,160,955, Cl. 354-269.000.

Nihon Gurei Kabushiki Kaisha: *See*—
Ono, Yukihito, 5,159,952, Cl. 137-505.410.

Niinai, Yoshitaka; Sagawa, Norihisa; Kawai, Yasuhiro; Igarashi, Sadato; and Ohyama, Hisanobu. Method of protecting rotating machine. 5,160,876, Cl. 318-460.000.

Niizawa, Koji, to Minolta Camera Kabushiki Kaisha. Image projecting apparatus furnished with image rotating mechanism. 5,160,950, Cl. 353-26.00A.

Nikolaus, Heinrich, to Mannesmann Rexroth GmbH. Circuitry for controlling control coils of servo devices in a hydraulic system. 5,159,812, Cl. 60-445.000.

Nikolaus, Heinrich; and Paton, Robert, to Zahnradfabrik Friedrichshafen AG. Continuously variable driving unit of a motor vehicle. 5,159,855, Cl. 74-850.000.

Nikoloff, Koyu P., to Cranston Print Works Company. Paper saturant. 5,160,484, Cl. 427-439.000.

Nikon Corporation: *See*—
Ihara, Yuji; and Tanioka, Hiroshi, 5,161,061, Cl. 359-708.000.
Moriyama, Keiji, 5,160,834, Cl. 250-201.800.
Ohshita, Koichi, 5,161,065, Cl. 359-739.000.
Ota, Kazuya; and Magome, Nobutaka, 5,160,849, Cl. 250-548.000.

Nims, Inc.: *See*—
Sackner, Marvin A.; and Sackner, Joathan D., 5,159,935, Cl. 128-721.000.

Ninomiya, Masakazu; Omori, Norio; and Nakagawa, Satoshi, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Lubricating apparatus for internal combustion engine. 5,159,910, Cl. 123-196.0AB.

Nippon Densan Corporation: *See*—
Hishida, Noriaki; and Iwazaki, Kuniyasu, 5,160,866, Cl. 310-90.000.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Asano, Kuniyoshi; Uemura, Tomoyoshi; and Takida, Hiroshi, 5,160,475, Cl. 264-331.170.

Nippon Metal Co., Ltd.: *See*—
Kimura, Hiroyoshi; and Nishiyama, Shinroku, 5,159,737, Cl. 15-314.000.

Nippon Mining Co., Ltd.: *See*—
Tomita, Masatoshi; Yamamoto, Susumu; and Tominaga, Chikara, 5,160,552, Cl. 148-277.000.

Nippon Oil & Fats Co., Ltd.: *See*—
Hasegawa, Etsuo; Takeoka, Shinji; Ohno, Hiroyuki; Nishide, Hiroyuki; and Tsuchida, Eishun, 5,160,740, Cl. 424-450.000.

Nippon Seiko Kabushiki Kaisha: *See*—
Mogi, Shinobu, 5,160,166, Cl. 280-804.000.

Nippon Sheet Glass Co., Ltd.: *See*—
Seki, Masafumi; Hashizume, Hideki; Nakama, Kenichi; and Kobayashi, Shigeru, 5,160,360, Cl. 65-30.130.

Nippon Soken, Inc.: *See*—
Saito, Kimitaka; Matsumoto, Tatsuyoshi; and Igashira, Toshihiko, 5,159,915, Cl. 123-557.000.

Nippon Stainless Steel Co., Ltd.: *See*—
Akiyama, Shunichiro; and Fujikawa, Hisao, 5,160,389, Cl. 148-327.000.

Nippon Television Network Corporation: *See*—
Sugimori, Yoshio; Takayama, Susumu; and Kurosaki, Tadao, 5,161,020, Cl. 358-183.000.

Nippon Thompson Co., Ltd.: *See*—
Inoue, Hiroshi; Hara, Takehiko; and Hidano, Kengo, 5,159,830, Cl. 73-118.100.

Nippon Zeon Co., Ltd.: *See*—
Futami, Takashi; Iwamoto, Tatsuhiko; and Okamura, Seijiro, 5,160,772, Cl. 428-71.000.

Nippondenso Co., Ltd.: *See*—
Ito, Koichi; Higashihara, Akihito; and Sugi, Hikaru, 5,160,115, Cl. 251-129.120.
Ninomiya, Masakazu; Omori, Norio; and Nakagawa, Satoshi, 5,159,910, Cl. 123-196.0AB.
Ohishi, Shigeji; Honda, Shin; Sakakibara, Hisayoshi; and Fujiwara, Kenichi, 5,159,820, Cl. 62-468.000.

Nishi, Tatsunari: *See*—
Yasumura, Shigeyoshi; Nishi, Tatsunari; and Ito, Seiga, 5,160,735, Cl. 424-94.630.

Nishide, Hiroyuki: *See*—
Hasegawa, Etsuo; Takeoka, Shinji; Ohno, Hiroyuki; Nishide, Hiroyuki; and Tsuchida, Eishun, 5,160,740, Cl. 424-450.000.

Nishikawa, Masao: *See*—
Gomi, Hiroshi; Kumagai, Tomoharu; Hirose, Masato; and Nishikawa, Masao, 5,159,988, Cl. 180-8.600.

Nishikawa, Yoshikazu: *See*—
Mabuchi, Toshiaki; and Nishikawa, Yoshikazu, 5,161,026, Cl. 358-225.000.

Nishimura, Shigefumi; Fukuda, Masao; and Shimizu, Yoshiji, to Shimizu Co., Ltd. Bath for immersion plating tin-lead alloys. 5,160,422, Cl. 205-254.000.

Nishino, Toshikazu: *See*—
Harada, Yutaka; Yano, Shinichiro; Miyake, Mutsuko; Kawabe, Ushio; and Nishino, Toshikazu, 5,160,983, Cl. 257-34.000.

Nishiyama, Shinroku: *See*—
Kimura, Hiroyoshi; and Nishiyama, Shinroku, 5,159,737, Cl. 15-314.000.

Nishiyama, Tetsuji; and Teraguchi, Takashi, to Sumitomo Rubber Industries, Ltd. Apparatus and method for determining instantaneous spatial position of spherical flying object. 5,160,839, Cl. 250-222.100.

Nishiyama, Tohru; and Kikuchi, Eiji, to Nissan Motor Co., Ltd. Method of forming automatic machine operation program. 5,161,101, Cl. 364-191.000.

Nishizawa, Muneo; and Yano, Hideaki, to Takata Corporation. Pretensioner for a vehicle safety belt system. 5,160,168, Cl. 280-806.000.

Nisizawa, Akinori: *See*—
Koga, Keiji; Satoh, Jun-ichi; Yokoyama, Kenji; Nisizawa, Akinori; and Tokuoka, Yasumichi, 5,160,761, Cl. 427-548.000.

Nissan Motor Co., Ltd.: *See*—
Hara, Toshiyuki; and Shirahama, Katsunori, 5,159,892, Cl. 116-28.100.
Kawabata, Kazunobu, 5,160,160, Cl. 280-707.000.
Kimura, Takashi; and Nomura, Keiji, 5,161,151, Cl. 370-13.000.
Nishiyama, Tohru; and Kikuchi, Eiji, 5,161,101, Cl. 364-191.000.
Shiraishi, Yasuhiro; and Ishikawa, Yasuki, 5,161,106, Cl. 364-424.050.
Sugiuchi, Masashi; and Kamiyama, Hiroshi, 5,159,905, Cl. 123-90.160.
Suzuki, Yutaka, 5,160,002, Cl. 192-3.310.
Suzuki, Yutaka, 5,160,003, Cl. 192-3.310.
Tsukamoto, Masahiro; and Kawabata, Kazunobu, 5,160,161, Cl. 280-707.000.

Nisshinbo Industries, Inc.: *See*—
Marutsuka, Toshinori; and Hasegawa, Osamu, 5,160,452, Cl. 252-309.000.
Nitta, Yukuo, to Seelex Kabushiki Kaisha. Hanging ornaments for eyeglasses. 5,161,234, Cl. 351-52.000.
Nitto Chemical Industry Co., Ltd.: *See*—
Sasaki, Yutaka; Kiyomiya, Yutaka; Nakamura, Toshio; Mori, Kunio; and Morii, Akimitsu, 5,160,721, Cl. 423-376.000.
Nitto Denko Corporation: *See*—
Yamaguchi, Tomoo; and Ikeda, Kenichi, 5,160,619, Cl. 210-500.380.
Niven, Ian E.: *See*—
Falou, Mohamad S.; Finch, Timothy D.; Garner-Gray, Peter F.; Hight, Andrew T.; Murphy, Martin M.; Newbold, Geoffrey; Niven, Ian E.; and Savill, Derek G., 5,160,654, Cl. 252-91.000.
NKK Corporation: *See*—
Suenaga, Hiroyoshi; Ito, Takeshi; Takagi, Masakuni; Takeuchi, Hiroyoshi; Fukai, Hideaki; and Minakawa, Kuninori, 5,159,787, Cl. 51-326.000.
NKT A/S NKT Alle: *See*—
Nordby, Rasmus, 5,161,173, Cl. 375-119.000.
Noble, Scott W., to Allied-Signal Inc. Mobile radio audio system. 5,161,198, Cl. 381-81.000.
Nobumoto, Kazutoshi: *See*—
Tsuyama, Toshiaki; Nobumoto, Kazutoshi; Kageyama, Fumio; and Okazaki, Haruki, 5,159,991, Cl. 180-197.000.
Noda, Yoshiaki: *See*—
Morishita, Yoshii; Sugimoto, Yasushi; Hayashida, Shigeru; Ishikawa, Hiroko; Noda, Yoshiaki; Murakami, Shigeru; Sato, Munehiro; Saito, Yoshinori; Kurata, Naoji; and Sugita, Yoshio, 5,160,487, Cl. 430-59.000.
Noestheden, Andrew, to Valiant Machine & Tool Inc. Device for separating hydrocarbon products from water with venturi jet pump. 5,160,605, Cl. 210-97.000.
Noguchi, Hiromichi: *See*—
Suga, Yuko; and Noguchi, Hiromichi, 5,160,370, Cl. 106-20.000.
Noguchi, Yukihiro: *See*—
Tonariya, Yoshito; Wada, Yukihito; Yamaguchi, Kazuhiro; Yamazaki, Tomio; Sakai, Isamu; Yokoi, Shigeru; Togashi, Mitsuo; and Noguchi, Yukihiro, 5,160,724, Cl. 424-4.000.
Nojima, Isao: *See*—
Owen, William H.; Caywood, John; Drori, Joseph; Jaffe, James; Nojima, Isao; Sung, Jeffrey; and Wang, Ping, 5,161,157, Cl. 371-10.200.
Nokia Mobile Phones Ltd.: *See*—
Visuri, Pauli, 5,160,900, Cl. 331-18.000.
Noland, Richard D., to Tech-Air, Inc. Pneumatic conveying system. 5,160,222, Cl. 406-124.000.
Noland, Richard L.: *See*—
Banura, George A.; and Noland, Richard L., 5,160,264, Cl. 434-2.000.
Nolte, Paul A., to Ingersoll-Rand Company. Tamper evident vent system for containers. 5,160,054, Cl. 220-374.000.
Nomura, Keiji: *See*—
Kimura, Takashi; and Nomura, Keiji, 5,161,151, Cl. 370-13.000.
Nomura, Masaki; Koike, Shin; Yamashita, Ko; Okisaka, Koichi; Sano, Yoshito; Omura, Hisao; Irinatsu, Yuuichi; Masui, Kenji; and Yasumasu, Takeshi, to Kao Corporation. Edible oil-in-water emulsion. 5,160,759, Cl. 426-602.000.
Nomura, Osamu, to Terumo Kabushiki Kaisha. Blood reservoir. 5,160,332, Cl. 604-405.000.
Nordby, Rasmus, to NKT A/S NKT Alle. Method of adjusting the phase of a clock generator with respect to a data signal. 5,161,173, Cl. 375-119.000.
Norddeutsche Seekabelwerk: *See*—
Basse, Hartwig; and Wittek, Jurgen, 5,160,395, Cl. 156-269.000.
Nordgren, Gregory N.: *See*—
Nichols, Colin J.; Nordgren, Gregory N.; and Moorehead, Harvey R., 5,160,325, Cl. 604-247.000.
Nordica S.p.A.: *See*—
Gorza, Roberto; Baggio, Giorgio; and Battistella, Mirco, 5,160,159, Cl. 280-632.000.
Nordmark Arzneimittel GmbH: *See*—
Moest, Thomas; and Pich, Claus H., 5,160,469, Cl. 264-117.000.
Nordson Corporation: *See*—
Saidman, Laurence B.; and Smith, James C., 5,159,894, Cl. 118-300.000.
Norman, Alan B.: *See*—
Arzonico, Barbara W.; Norman, Alan B.; and Gentry, Thomas L., 5,159,944, Cl. 131-365.000.
Norman, Ronald J.: *See*—
Siriporn, Charn; Milcarek, Charles S., Jr.; Norman, Ronald J.; Baum, Randon L.; and Holecek, Michael G., 5,160,129, Cl. 271-178.000.
Norsk Hydro a.s.: *See*—
Myrbostad, Erling; and Venas, Karl, 5,160,533, Cl. 75-10.450.
Northern Telecom Limited: *See*—
Meche, Paul S.; Hanley, Donald V.; and Chaplain, Eugenie M., 5,161,249, Cl. 455-33.300.
Norton Company: *See*—
Carman, Lee A.; Coblenz, William S.; and Hammarstrom, Janet L., 5,160,509, Cl. 51-307.000.
Norton, William W., to Culligan International Company. High efficiency water treatment system. 5,160,608, Cl. 210-134.000.
Nose, Noriyuki: *See*—
Ebinuma, Ryuichi; Ozawa, Kunitaka; Kariya, Takao; Uzawa, Shunichi; and Nose, Noriyuki, 5,161,176, Cl. 378-34.000.
Notetry Limited: *See*—
Dyson, James, 5,160,356, Cl. 55-345.000.
Nova Corporation of Alberta: *See*—
Hill, Michael F., 5,160,218, Cl. 405-154.000.
NovAtel Communications, Ltd.: *See*—
Braathen, Russell E., 5,161,254, Cl. 455-306.000.
NTN Corporation: *See*—
Harimoto, Kazuyoshi, 5,159,852, Cl. 74-559.000.
Okaniwa, Takashi; Takeuchi, Kiyoshi; Kato, Toshiharu; and Nagasawa, Keizo, 5,160,645, Cl. 252-32.70E.
Nu-Zip Dee Mfg., Inc.: *See*—
Miller, Robert H., 5,160,105, Cl. 248-188.900.
Nucon Corporation: *See*—
Pigott, Maurice J.; Pigott, Brandon L.; Pigott, Peter S.; and Pigott, Schuyler F., 5,160,029, Cl. 206-453.000.
Nudd, Howard W.: *See*—
Prescott, Robert C.; Simpson, Donald C.; Sanford, Philip H.; and Nudd, Howard W., 5,159,949, Cl. 137-84.000.
Nuelle, Douglas G.: *See*—
Alpern, Michael C.; Brandon, Ralph J.; and Nuelle, Douglas G., 5,160,262, Cl. 433-58.000.
Nuzzolo, Carlo A.: *See*—
Colapicchioni, Claudio; Porcelli, Filippo; and Nuzzolo, Carlo A., 5,160,597, Cl. 204-403.000.
Nye, Norman H. Container valve having a weighted actuator. 5,160,072, Cl. 222-463.000.
Nynex Corporation: *See*—
McAndrews, Joseph M., 5,160,851, Cl. 307-66.000.
O&K Orenstein & Koppel Aktiengesellschaft: *See*—
Reinecke, Udo; and Leidinger, Gustav, 5,159,992, Cl. 180-307.000.
Oakley, Francis R.: *See*—
Marritt, Clifford R.; Oakley, Francis R.; and Holmes, Gregory A., 5,159,939, Cl. 131-84.200.
Oakley, Thomas F., to ESAB Welding Products, Inc. Mounting apparatus for a cutting torch. 5,160,821, Cl. 219-121.560.
Obara, Kazutoshi: *See*—
Ohahima, Minoru; Morio, Shuichi; Saitoh, Susumu; Namikawa, Osamu; Obara, Kazutoshi; Seino, Minoru; Mochizuki, Takeshi; Nakura, Makoto; Arimoto, Akira; and Kasai, Masuo, 5,161,046, Cl. 359-212.000.
Obata, Hiroyuki: *See*—
Matsuo, Makoto; Utsumi, Minoru; Ogusu, Chihaya; Mukasa, Shunsuke; Kudo, Yoshiaki; Obata, Hiroyuki; Aono, Takashi; Mohri, Hiroshi; Koike, Masato; Amano, Hideaki; and Saito, Norikazu, 5,161,233, Cl. 355-218.000.
Odagiri, Sinji: *See*—
Hakkaku, Kunio; Tomoda, Susumu; Morita, Satosi; Masuda, Akira; and Odagiri, Sinji, 5,161,038, Cl. 358-496.000.
Odanaka, Shinji, to Matsushita Electric Industrial Co., Inc. Structure and method of manufacture for semiconductor device. 5,160,996, Cl. 257-375.000.
Odawara, Shiro; Ito, Keiichi; and Kobayashi, Kazushi, to Taikisha Ltd. Cleaning system for use in treatment of excess paint. 5,160,040, Cl. 210-167.000.
O'Donnell, David B.: *See*—
Smith, Gaylord D.; Wendler, Walter H.; and O'Donnell, David B., 5,160,382, Cl. 148-327.000.
Odorisio, Nicola. Materials handling device. 5,159,769, Cl. 37-278.000.
Odorisio, Paul A.; Chasan, David E.; and Pastor, Stephen D., to Ciba-Geigy Corporation. Substituted 1-aminonaphthalenes and stabilized compositions. 5,160,647, Cl. 252-47.000.
Oehler, Reinhard; Meyer, Urs; and Bischofberger, Jurg, to Maschinenfabrik Rieter AG. Method and apparatus for regulating quality parameters in a yarn production line. 5,161,111, Cl. 364-470.000.
Oettgen, Herbert F.: *See*—
Welt, Sydney; Divgi, Chaitanya R.; Yeh, Samual; Old, Lloyd J.; Oettgen, Herbert F.; Real, Francisco X.; and Sakamoto, Junichi, 5,160,723, Cl. 424-1.100.
Ogasawara, Kenzi: *See*—
Yoshioka, Shingo; Ogasawara, Kenzi; Sawa, Yoshihide; and Yoshimitsu, Tokio, 5,160,781, Cl. 428-224.000.
Ogata, Masahiro: *See*—
Kajimoto, Takeshi; Shimbo, Yutaka; Sato, Katsuyuki; Ogata, Masahiro; Kenmizaki, Kanehide; Kubono, Shouji; Kato, Nobuo; Manita, Kiichi; and Kanamitsu, Michitaro, 5,161,120, Cl. 365-189.050.
Ogawa, Hiroshi; and Iimura, Shinichiro, to Sony Corporation. Optical disc recording apparatus. 5,161,145, Cl. 369-59.000.
Oguma, Shigeru: *See*—
Yoshizawa, Yoshihito; Yamauchi, Kiyotaka; and Oguma, Shigeru, 5,160,379, Cl. 148-108.000.
Oguni, Kensaku: *See*—
Hojo, Toshiyuki; Tokusa, Kenji; Oguni, Kensaku; and Nakayama, Susumu, 5,159,817, Cl. 62-81.000.
Ogusu, Chihaya: *See*—
Matsuo, Makoto; Utsumi, Minoru; Ogusu, Chihaya; Mukasa, Shunsuke; Kudo, Yoshiaki; Obata, Hiroyuki; Aono, Takashi; Mohri, Hiroshi; Koike, Masato; Amano, Hideaki; and Saito, Norikazu, 5,161,233, Cl. 355-218.000.
O'Hara, John; Fuhrman, Fred L.; Wolfe, David R.; and Irwin, Bruce C., to Hauck Manufacturing Company. Draft control method and apparatus for material processing plants. 5,160,259, Cl. 432-37.000.

O'Hara, Shunji: *See*—
Ishida, Takashi; O'Hara, Shunji; Ishibashi, Kenzo; and Satoh, Toshio, 5,161,243, Cl. 369-44.250.
Ohba, Toshio: *See*—
Urabe, Yoshihiko; and Ohba, Toshio, 5,159,879, Cl. 101-465.000.
Ohbayashi, Tetsuro: *See*—
Ikegami, Tatsuji; Ohbayashi, Tetsuro; Yoshida, Keiichi; and Iguchi, Masashi, 5,160,250, Cl. 415-90.000.
Ohguri, Kunio: *See*—
Owada, Ryoichi; Mekata, Satoshi; and Ohguri, Kunio, 5,160,665, Cl. 252-307.000.
Ohi Seisakusho Co., Ltd.: *See*—
Hara, Toshiyuki; and Shirahama, Katsunori, 5,159,892, Cl. 116-28.100.
Ohira, Hideo: *See*—
Murakami, Tokumichi; Kamizawa, Koh; Kinjo, Naoto; Ohira, Hideo; and Wakabayashi, Takao, 5,161,247, Cl. 395-800.000.
Ohishi, Shigeji; Honda, Shin; Sakakibara, Hisayoshi; and Fujiwara, Kenichi, to Nippondenso Co., Ltd. Oil separator integrally mounted on compressor. 5,159,820, Cl. 62-468.000.
Ohlson, Carl-Eric. Method of examining X-ray films and the like and an examination cabinet for such film examination. 5,159,771, Cl. 40-361.000.
Ohmi, Tadahiro; Kawakami, Michiya; Shibata, Tadashi; and Umeda, Masaru, to Ohmi, Tadahiro;. Piping system for supplying ultra-pure water. 5,160,429, Cl. 210-137.000.
Ohmi, Tadahiro;: *See*—
Ohmi, Tadahiro; Kawakami, Michiya; Shibata, Tadashi; and Umeda, Masaru, 5,160,429, Cl. 210-137.000.
Ohmori, Masaki: *See*—
Yamamoto, Kiyoshi; Kuwabara, Tetsuo; Shigyo, Isamu; Ohmori, Masaki; and Yoshimura, Fumitaka, 5,160,362, Cl. 65-102.000.
Ohmstede Mechanical Services, Inc.: *See*—
Boisture, Thomas B., 5,160,548, Cl. 134-7.000.
Ohno, Hiroyuki: *See*—
Hasegawa, Etsuo; Takeoka, Shinji; Ohno, Hiroyuki; Nishide, Hiroyuki; and Tsuchida, Eishun, 5,160,740, Cl. 424-450.000.
Ohsaki, Makoto: *See*—
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.
Ohsawa, Takayuki: *See*—
Tomita, Kan; Ohsawa, Takayuki; Takanashi, Kenichi; and Endo, Osamu, 5,161,047, Cl. 359-216.000.
Ohshima, Kenji: *See*—
Sato, Hiroyuki; Tanaka, Nobuhiro; and Ohshima, Kenji, 5,161,130, Cl. 368-228.000.
Ohshima, Mineo; and Fujikawa, Akinobu, to Matsushita Electric Industrial Co., Ltd. Tape cassette with slidable shutter. 5,161,079, Cl. 360-132.000.
Ohshima, Minoru; Morio, Shuichi; Saitoh, Susumu; Namikawa, Osamu; Obara, Kazutoshi; Seino, Minoru; Mochizuki, Takeshi; Nakura, Makoto; Arimoto, Akira; and Kasai, Masuo, to Hitachi Koki Co., Ltd.; and Hitachi, Ltd. Beam position control apparatus. 5,161,046, Cl. 359-212.000.
Ohshita, Koichi, to Nikon Corporation. Behind stop wide angle lens system. 5,161,065, Cl. 359-739.000.
Ohta, Kenji: *See*—
Nakayama, Junichiro; Kimura, Kazuhiro; Katayama, Hiroyuki; and Ohta, Kenji, 5,160,572, Cl. 156-510.000.
Ohta Seiyaku Kabushiki Kaisha: *See*—
Tonariya, Yoshito; Wada, Yukihito; Yamaguchi, Kazuhiro; Yamazaki, Tomio; Sakai, Isamu; Yokoi, Shigeru; Togashi, Mitsuo; and Noguchi, Yukihiro, 5,160,724, Cl. 424-4.000.
Ohyama, Hisanobu: *See*—
Niinai, Yoshitaka; Sagawa, Norihisa; Kawai, Yasuhiro; Igarashi, Sadato; and Ohyama, Hisanobu, 5,160,876, Cl. 318-460.000.
Oil Dynamics, Inc.: *See*—
Wilson, Brown L., 5,160,240, Cl. 415-170.100.
OIS Optical Imaging Systems, Inc.: *See*—
Abileah, Adiel; Sherman, Charles; and Cammarata, Robert M., 5,161,041, Cl. 359-40.000.
Oishi, Harumichi, to Daiwa Seiko, Inc. Clutch device for automatic paper feeder. 5,160,128, Cl. 271-114.000.
Oishi, Yasuhiro, to Olympus Optical Co., Ltd. Pixel array scanning circuitry for a solid state imaging apparatus. 5,161,024, Cl. 358-213.240.
Ojima, Masahiro: *See*—
Saito, Atsushi; Ojima, Masahiro; and Ito, Masaru, 5,161,135, Cl. 369-13.000.
Okabe, Hideki: *See*—
Miyazawa, Toshiki; Sakaguchi, Masahide; and Okabe, Hideki, 5,159,826, Cl. 72-358.000.
Okada, Hiroki; Mitsuhashi, Hiroshi; and Sakamoto, Susumu, to Tokico Ltd. Scroll type fluid apparatus having sealing member in recess forming suction space. 5,160,253, Cl. 418-55.200.
Okada, Yosuhiro: *See*—
Tukiyama, Yasutaka; Itami, Tadashi; Okada, Yosuhiro; and Hamamoto, Syougo, 5,160,873, Cl. 318-254.000.
Okahara, Mitsuo; and Masuyama, Araki, to Lion Corporation. Surface-active agents having two hydrophobic chains and two hydrophilic groups. 5,160,450, Cl. 252-174.210.
Okamoto, Toshihiko: *See*—
Takaichi, Akihisa; Okamoto, Toshihiko; and Matsumoto, Toshiaki, 5,160,728, Cl. 424-44.000.
Okamura, Seijiro: *See*—
Futami, Takashi; Iwamoto, Tatsuhiko; and Okamura, Seijiro, 5,160,772, Cl. 428-71.000.
Okaniwa, Takashi; Takeuchi, Kiyoshi; Kato, Toshiharu; and Nagasawa, Keizo, to NTN Corporation. Grease composition for constant velocity joint. 5,160,645, Cl. 252-32.70E.
Okano, Takashi, to Pioneer Electronic Corporation. Disk playing apparatus for playing CLV disks. 5,161,142, Cl. 369-50.000.
Okazaki, Haruki: *See*—
Tsuyama, Toshiaki; Nobumoto, Kazutoshi; Kageyama, Fumio; and Okazaki, Haruki, 5,159,991, Cl. 180-197.000.
OKI Electric Industry Co., Ltd.: *See*—
Cho, Shizuo, 5,161,121, Cl. 365-189.060.
Okisaka, Koichi: *See*—
Nomura, Masaki; Koike, Shin; Yamashita, Ko; Okisaka, Koichi; Sano, Yoshito; Omura, Hisao; Irinatsu, Yuuichi; Masui, Kenji; and Yasumasu, Takeshi, 5,160,759, Cl. 426-602.000.
Okuda, Yoshihiro: *See*—
Matsuda, Eichika; Murata, Kaoru; and Okuda, Yoshihiro, 5,161,118, Cl. 364-744.000.
Old, Lloyd J.: *See*—
Welt, Sydney; Divgi, Chaitanya R.; Yeh, Samual; Old, Lloyd J.; Oettgen, Herbert F.; Real, Francisco X.; and Sakamoto, Junichi, 5,160,723, Cl. 424-1.100.
Olin Corporation: *See*—
Cawlfield, David W.; Dotson, Ronald L.; Duncan, Budd L.; Mendiratta, Sudhir K.; and Woodard, Kenneth E., Jr., 5,160,416, Cl. 204-82.000.
Olin, Ray L. Bale discharging pusher for baling machines. 5,159,876, Cl. 100-88.000.
Olivier, Michel: *See*—
Rotman, Frederic; Rancon, Yannick; Queille, Philippe; and Olivier, Michel, 5,160,765, Cl. 427-229.000.
Ollervides, Marina T.: *See*—
Montemayor, Ezequiel d.; Ollervides, Marina T.; and Gonzalez, Rita M., 5,160,377, Cl. 118-13.000.
Olsen, Richard G., to United States of America, Navy. Electromagnetic warming of submerged extremities. 5,160,828, Cl. 219-211.000.
Olson, John C. Method for tire sidewall repair. 5,160,394, Cl. 156-97.000.
Olympus Optical Co., Ltd.: *See*—
Oishi, Yasuhiro, 5,161,024, Cl. 358-213.240.
OM Industrial Co., Ltd.: *See*—
Sato, Kyokuichi; and Fujita, Juichi, 5,159,953, Cl. 137-527.800.
Omata, Yasukini; and Osamura, Yoshinori, to Minolta Camera Kabushiki Kaisha. Serial type thermal printer. 5,160,942, Cl. 346-76.0PH.
Omnisec AG: *See*—
Maurer, Ueli, 5,161,244, Cl. 380-43.000.
Omori, Hiroshi: *See*—
Kikuchi, Masatsune; Omori, Hiroshi; Hosoda, Hatsutoshi; and Kouda, Susumu, 5,160,376, Cl. 106-819.000.
Omori, Norio: *See*—
Ninomiya, Masakazu; Omori, Norio; and Nakagawa, Satoshi, 5,159,910, Cl. 123-196.0AB.
Omrom Corp.: *See*—
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,979, Cl. 356-423.000.
Omron Corporation: *See*—
Tsuji, Hideaki, 5,160,910, Cl. 335-129.000.
Omura, Hisao: *See*—
Nomura, Masaki; Koike, Shin; Yamashita, Ko; Okisaka, Koichi; Sano, Yoshito; Omura, Hisao; Irinatsu, Yuuichi; Masui, Kenji; and Yasumasu, Takeshi, 5,160,759, Cl. 426-602.000.
Omura, Katsuyuki, to Ricoh Company, Ltd. CCD output signal processing method and apparatus. 5,161,113, Cl. 364-486.000.
Onahama Smelting and Refining Company, Ltd.: *See*—
Sugawara, Yukio; Hayashi, Mineo; Konishi, Junji; and Hayashi, Shosaku, 5,160,588, Cl. 204-109.000.
Onan, David D.; Davis, Garland W.; and Cromwell, Roger S., to Halliburton Company. Well completion and remedial methods utilizing rubber latex compositions. 5,159,980, Cl. 166-294.000.
Ono, Hirofumi; and Furukado, Tatsuhiko, to Lintec Co., Ltd. Mass flow controller. 5,159,951, Cl. 137-486.000.
Ono, Michio; Kume, Masaharu; and Matsuo, Takayuki, to Asahi Glass Company Ltd. Structure for installing mirror base on glass plate and method for installing mirror base on glass plate. 5,160,780, Cl. 428-220.000.
Ono, Takashi; Yagyu, Tatsuya; Fukuda, Katsumi; and Terasaki, Minako, to Orient Chemical Industries, Ltd. Metal complex dye, method of its production and dyeing method. 5,160,304, Cl. 8-436.000.
Ono, Yukihito, to Honda Giken Kogyo Kabushiki Kaisha; and Nihon Gurei Kabushiki Kaisha. Regulator for water base paint. 5,159,952, Cl. 137-505.410.
Onoda Cement Co., Ltd.: *See*—
Kikuchi, Masatsune; Omori, Hiroshi; Hosoda, Hatsutoshi; and Kouda, Susumu, 5,160,376, Cl. 106-819.000.
Onopchenko, Anatoli: *See*—
Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, 5,160,650, Cl. 252-49.600.
Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, 5,160,651, Cl. 252-49.600.

Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, 5,160,652, Cl. 252-49.600.

Ooiwa, Kiyoshi: *See*—
Doki, Masahiko; and Ooiwa, Kiyoshi, 5,160,397, Cl. 156-345.000.

Oono, Tetsuya: *See*—
Kitagawa, Hiroshi; Oono, Tetsuya; and Suzuki, Norio, 5,159,831, Cl. 73-118.100.

Opitz, Hans-Peter, to Rheinmetall GmbH. Acceleration resistant packaging for integrated circuits and method of producing them. 5,160,999, Cl. 257-702.000.

Optical Coating Laboratory, Inc.: *See*—
Imus, Mark H., 5,160,668, Cl. 264-1.700.

O'Quin, John C., III: *See*—
Nicholson, James O.; O'Quin, John C., III; O'Quin, John T., II; and Strietelmeier, Frederick E., 5,161,219, Cl. 395-425.000.

O'Quin, John T., II: *See*—
Nicholson, James O.; O'Quin, John C., III; O'Quin, John T., II; and Strietelmeier, Frederick E., 5,161,219, Cl. 395-425.000.

Or, Wilson: *See*—
Hutcheson, Timothy L.; Or, Wilson; Narayanan, Venkatesh; Mohan, Subramaniam; Wohlmut, Peter G.; Srinivasan, Ramanujam; Hunt, Bobby R.; and Ryan, Thomas W., 5,161,204, Cl. 382-16.000.

Orain, Michel, to Glaenzer Spicer. Process and tool for producing a barrel for a telescopic universal transmission joint. 5,160,108, Cl. 72-370.000.

O'Reilly, David W., to Smith & Loveless, Inc. Radial header for dissolved air flotation systems. 5,160,610, Cl. 210-194.000.

Orient Chemical Industries, Ltd.: *See*—
Ono, Takashi; Yagyu, Tatsuya; Fukuda, Katsumi; and Terasaki, Minako, 5,160,504, Cl. 8-436.000.

Orlowski, David P.: *See*—
Farrell, Richard B.; and Orlowski, David P., 5,160,190, Cl. 312-201.000.

Ormco Corporation: *See*—
Alpern, Michael C.; Brandon, Ralph J.; and Nuelle, Douglas G., 5,160,262, Cl. 433-58.000.

Ortiz, Mark: *See*—
Chen, Chao C.; Zwaskis, William; and Ortiz, Mark, 5,160,339, Cl. 606-158.000.

Orvitek, Inc.: *See*—
Saposnik, Fabio J.; and Barrette, Michael G., 5,160,918, Cl. 340-709.000.

Osaka Aerosol Industries Corporation: *See*—
Owada, Ryoichi; Mekata, Satoshi; and Ohguri, Kunio, 5,160,665, Cl. 252-307.000.

Osaka Vacuum, Ltd.: *See*—
Ikegami, Tatsuji; Ohbayashi, Tetsuro; Yoshida, Keiichi; and Iguchi, Masashi, 5,160,250, Cl. 415-90.000.

Osamura, Yoshinori: *See*—
Omata, Yasukini; and Osamura, Yoshinori, 5,160,942, Cl. 346-76.0PH.

Osawa, Nobuhiko, to Pioneer Electronic Corporation; and Pioneer Video Corporation. MIS-FET with small chip area and high strength against static electricity. 5,160,990, Cl. 257-355.000.

Oshima, Muneo: *See*—
Sagawa, Tetsuya; Aoyama, Koji; and Oshima, Muneo, 5,160,279, Cl. 439-595.000.

Ota, Harutoshi: *See*—
Naoi, Yasushi; Kobayashi, Kenichi; Ota, Harutoshi; and Kuribayashi, Yasushi, 5,159,850, Cl. 74-523.000.

Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., to Omrom Corp.; and Boehringer Mannheim Corp. Test piece coloration comparative decision unit. 5,160,979, Cl. 356-423.000.

Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., to Boehringer Mannheim Corp. Test piece coloration comparative decision unit. 5,160,980, Cl. 356-423.000.

Ota, Kazuya; and Magome, Nobutaka, to Nikon Corporation. Diffraction-type displacement detector for alignment of mask and wafer. 5,160,849, Cl. 250-548.000.

Otaki, Shiro, to Acheson Industries, Inc. Internal coating materials for a cathode ray tube. 5,160,375, Cl. 106-475.000.

Otani, Kenji: *See*—
Takada, Kunio; Otani, Kenji; and Manabe, Akira, 5,160,216, Cl. 405-92.000.

Otari, Inc.: *See*—
Nakano, Haruo; and Sota, Koichi, 5,160,571, Cl. 156-505.000.

Otis Engineering Corporation: *See*—
Le, Nam V., 5,159,981, Cl. 166-325.000.

Otor: *See*—
Bacques, Jean-Yves; and Coalier, Guy, 5,160,307, Cl. 493-176.000.

Otsubo, Peggy M.: *See*—
Carter, Jeffery A.; Otsubo, Peggy M.; Gravenstede, Kenneth N.; and Grotz, Robert A., 5,161,230, Cl. 395-800.000.

Otsuka Pharmaceutical Co., Ltd.: *See*—
Takaichi, Akihisa; Okamoto, Toshihiko; and Matsumoto, Toshiaki, 5,160,728, Cl. 424-44.000.

Ott, Michael J.; Bazemore, Jeffrey T.; and Brogley, Mark E., to Siecor Corporation. Tool for preparing optical ribbons. 5,160,569, Cl. 156-439.000.

Owada, Ryoichi; Mekata, Satoshi; and Ohguri, Kunio, to Osaka Aerosol Industries Corporation. Aerosol composition exhibiting crackling sound using aliphatic hydrocarbon propellants. 5,160,665, Cl. 252-307.000.

Owen, H.: *See*—
Le, Q. N.; Owen, H.; and Schipper, P. H., 5,160,424, Cl. 208-67.000.

Owen, Marvin L.: *See*—
Fitzgerald, James J.; and Owen, Marvin L., 5,160,277, Cl. 439-554.000.

Owen, S. Hudson; Baldwin, Roger A.; Taylor, Gerald E.; and Wolff, Paul A., to Kerr-McGee Corporation. Method for adhesively bonding a rail-tie fastening assembly to a wooden railway tie. 5,160,084, Cl. 238-310.000.

Owen, William H.; Caywood, John; Drori, Joseph; Jaffe, James; Nojima, Isao; Sung, Jeffrey; and Wang, Ping, to Xicor, Inc. Field-programmable redundancy apparatus for memory arrays. 5,161,157, Cl. 371-10.200.

Owens-Brockway Glass Container Inc.: *See*—
Perry, Jack L.; and Menzie, Andrew B., 5,160,015, Cl. 198-468.010.

Owens, Dolores; and Cory, Evelyn. Device for cleaning toilet seats. 5,159,735, Cl. 15-104.940.

Oxley, L. Thomas, to T Systems Inc. Biological fluid specimen collection bag. 5,160,329, Cl. 604-317.000.

Oy Nokia AB: *See*—
Honkanen, Seppo; and Tervonen, Ari, 5,160,523, Cl. 65-30.130.

Ozaki, Keiichi; Terada, Katsuaki; and Tahara, Shinobu, to Yazaki. Branch junction box and busbars for branch connection. 5,160,274, Cl. 439-212.000.

Ozawa, Kunitaka: *See*—
Ebinuma, Ryuichi; Ozawa, Kunitaka; Kariya, Takao; Uzawa, Shunichi; and Nose, Noriyuki, 5,161,176, Cl. 378-34.000.

Ozawa, Michiharu: *See*—
Yukumoto, Masao; Ozawa, Michiharu; Ishii, Kazuhide; and Shimizu, Hiroshi, 5,160,390, Cl. 148-325.000.

Paajanen, Alpo. Pressure bar for veneer slicing machines. 5,159,963, Cl. 144-213.000.

Padilla, Antonio A.: *See*—
Gunnerson, Fred S.; Sanderlin, F. Dave; Iurato, Joy R.; and Padilla, Antonio A., 5,159,972, Cl. 165-32.000.

Palanisamy, Thirumalai G., to Allied-Signal Inc. Method and apparatus for charging and testing batteries. 5,160,880, Cl. 320-32.000.

Palanque, Serge: *See*—
Chazalon, Michel; Gauthereau, Didier; Micolon, Patrice; and Palanque, Serge, 5,160,565, Cl. 156-242.000.

Palisin, Stephen P., Jr.; and Keller, Raymond J., to Berwick Manufacturing Inc. Nestable container and method of making. 5,160,031, Cl. 206-519.000.

Pallaske, Michael: *See*—
Metzner, Wolfgang; Pallaske, Michael; and Wegen, Hans-Werner, 5,159,778, Cl. 43-121.000.

Palmacci, Stephen: *See*—
Josephson, Lee; Groman, Ernest V.; and Palmacci, Stephen, 5,160,726, Cl. 424-9.000.

Palmer, Harvey J.; and Columbus, Richard L., to Eastman Kodak Company. Self-cleaning pipette tips. 5,159,842, Cl. 73-864.010.

Panametrics, Inc.: *See*—
Lynnworth, Lawrence C., 5,159,838, Cl. 73-644.000.

Papuchon, Michel: *See*—
Delacourt, Dominique; Papuchon, Michel; and Pocholle, Jean-Paul, 5,160,991, Cl. 250-338.400.

Park, Chong-il: *See*—
Kizaki, Takayasu; Park, Chong-il; and Yamada, Reiichi, 5,160,747, Cl. 425-352.000.

Park, Harry: *See*—
Fishman, Udi; and Park, Harry, 5,160,068, Cl. 222-352.000.

Parker, Darren L. Automotive windshield deice apparatus. 5,160,827, Cl. 219-203.000.

Parker, Kenneth W. Vacuum system for multiple work areas. 5,160,292, Cl. 454-49.000.

Parker, Lanny L.; Atriss, Ahmad H.; and Mueller, Dean W., to Motorola, Inc. Circuit and method of detecting an invalid clock signal. 5,161,175, Cl. 377-70.000.

Parkinson, Dean B.; and Bergren, Orton D., to SRI Inc. Mechanically erasable ballpoint ink. 5,160,369, Cl. 106-19.00R.

Parkinson, Dean B.: *See*—
Frederickson, Arthur R.; Nanevicz, Joseph E.; Thayer, Jeffrey S.; and Parkinson, Dean B., 5,160,374, Cl. 106-401.000.

Parks, Laura L.; and Greatting, Allen D., to Protein Technologies International, Inc. Process for the production of a protein granule suitable for use as a meat extender. 5,160,758, Cl. 426-506.000.

Parulski, Kenneth A.: *See*—
Monta, Peter A.; Lim, Jae S.; and Parulski, Kenneth A., 5,161,006, Cl. 358-31.000.

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Welkowsky, Murray S.; Vasudev, P. K.; Reif, Philip G.; and Goodwin, Norman W., 5,160,560, Cl. 156-154.000.
Reifenberger, Ronald G.: *See—*
Goldberg, Harris A.; and Reifenberger, Ronald G., 5,161,147, Cl. 369-100.000.
Reik, Wolfgang; and Jackel, Johann, to LUK Lamellen und Kupplungsbau GmbH. Apparatus for transmitting torque in the power trains of motor vehicles. 5,160,007, Cl. 192-70.170.
Reimert, Rainer: *See—*
Schaub, Georg; Bandel, Gebhard; Reimert, Rainer; and Beiswenger, Hans, 5,159,886, Cl. 110-347.000.
Rein, Rudiger; Jentsch, Dieter; and Wittel, Kalus-Werner, to Metallgesellschaft Aktiengesellschaft. Activator for use in phosphating processes. 5,160,551, Cl. 148-254.000.
Reinecke, Udo; and Leidinger, Gustav, to O&K Orenstein & Koppel Aktiengesellschaft. Infinitely variable hydrostatic transmission drive. 5,159,992, Cl. 180-307.000.
Reinert, Gerhard: *See—*
Fuso, Francesco; and Reinert, Gerhard, 5,160,346, Cl. 8-442.000.
Reinhart, Michael A.: *See—*
Charles, Joseph T.; and Reinhart, Michael A., 5,160,852, Cl. 307-77.000.
Reininger, Matthias G.: *See—*
Weigert, Fidelo; and Reininger, Matthias G., 5,159,749, Cl. 29-742.000.
Reliable Corporation of America, The: *See—*
Greer, Thomas W., 5,160,146, Cl. 273-269.000.
Reliance Electric Industrial Company: *See—*
Whiddon, Richard, 5,160,113, Cl. 248-638.000.
Remde, Ulrich: *See—*
Hartel, Gunter; Schurfeld, Armin; Losing, Karl-Henrich; Thonnessen, Dieter; and Remde, Ulrich, 5,159,898, Cl. 123-1.00A.
Remedia AG: *See—*
Schluter, Gert, 5,160,704, Cl. 422-101.000.
Renne Ty Tan, Michael: *See—*
Wang, Shih-Yuan; and Renne Ty Tan, Michael, 5,160,492, Cl. 437-22.000.
Renner, Gilles: *See—*
Silber, Gerard; and Renner, Gilles, 5,159,839, Cl. 73-714.000.
Reps, Thomas; Horwitz, Susan; and Binkley, David, to Wisconsin Alumni Research Foundation. Interprocedural slicing of computer programs using dependence graphs. 5,161,216, Cl. 395-375.000.
Reuter, Robert E.: *See—*
Rorke, A. Brooks; Bullwinkle, Wallace C.; Stephens, William I.; Reuter, Robert E.; and Rizzi, John J., 5,160,188, Cl. 312-196.000.
Revision Qix, Ltd.: *See—*
Lockhart, John E., 5,160,208, Cl. 402-24.000.
Revlon Consumer Products Corporation: *See—*
Kamen, Melvin E., 5,160,689, Cl. 264-297.800.
Rexham Corporation: *See—*
Lafreniere, Loren F., 5,160,083, Cl. 229-162.000.
Rexroth-Sigma: *See—*
Rigat-Esselin, J. Pierre; Gerbier, Patrick; and Menvielle, Marc, 5,160,928, Cl. 341-20.000.
Reymond, Welles K., to General DataComm, Inc. Integrated circuit packages using tapered spring contact leads for direct mounting to circuit boards. 5,160,270, Cl. 439-70.000.
Rheinmetall GmbH: *See—*
Grosch, Hermann, 5,161,127, Cl. 367-124.000.
Opitz, Hans-Peter, 5,160,999, Cl. 257-702.000.
Rhone-Poulenc Chimie: *See—*
Constantini, Michel; and Popa, Jean-Michel, 5,160,496, Cl. 568-771.000.
Richan, K. Brook: *See—*
Schneider, J. Wayne; Richan, K. Brook; and Wilson, Richard K., 5,161,116, Cl. 364-551.010.
Richards, Linda K.; and Richards, Norvel D. Unified dental floss and bridge threader. 5,159,943, Cl. 132-321.000.
Richards, Norvel D.: *See—*
Richards, Linda K.; and Richards, Norvel D., 5,159,943, Cl. 132-321.000.
Richburg, James B. Meat deboning apparatus and method. 5,160,290, Cl. 452-135.000.
Richter Gedeon Vegyeszeti Gyar R.T.: *See—*
Lukacsovich, Tamas; Venetianer, Pal; Gaal, Tamas; Boros, Imre; and Baliko, Gabriella, 5,160,489, Cl. 435-172.300.
Ricoh Company, Ltd.: *See—*
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.
Omura, Katsuyuki, 5,161,113, Cl. 364-486.000.
Segawa, Hideki, 5,161,136, Cl. 369-32.000.
Suzuki, Haruyuki, 5,161,137, Cl. 369-32.000.
Tomita, Kan; Ohsawa, Takayuki; Takanashi, Kenichi; and Endo, Osamu, 5,161,047, Cl. 359-216.000.
Yasui, Takashi; Fukushima, Masanobu; and Hara, Kazuhiko, 5,161,228, Cl. 395-725.000.
Yasui, Takashi; Yoshioka, Keiichi; and Yamaura, Shinichi, 5,161,229, Cl. 395-775.000.
Rideout, Jan: *See—*
Clubley, Brian G.; and Rideout, Jan, 5,160,630, Cl. 210-699.000.
Riedel-De Haen AG: *See—*
Lindner, Wolfgang; Neuber, Hans-Ulrich; and Taschenbrecker, Erich, 5,160,666, Cl. 252-402.000.
Riehl, Fred, to Robertshaw Controls Company. Burner construction, igniter assembly therefor and methods of making the same. 5,160,256, Cl. 431-266.000.
Ries, Juergen: *See—*
Radtke, Manfred; and Ries, Juergen, 5,160,089, Cl. 227-111.000.
Riesen, Jon A.: *See—*
Ash, Kenneth C.; Crocker, William A.; Haygarth, John C.; Lee, David R.; Morris, Donald; Peterson, John R.; Riesen, Jon A.; and Yih, Robert S., 5,160,482, Cl. 423-75.000.
Rieter Machine Works, Ltd.: *See—*
Wernli, Jorg, 5,159,805, Cl. 57-281.000.
Rigat-Esselin, J. Pierre; Gerbier, Patrick; and Menvielle, Marc, to Rexroth-Sigma. System for regulating the mean current flowing through the load of an electric remote control device. 5,160,928, Cl. 341-20.000.
Righetti, Aldo: *See—*
Grasso, Giorgio; and Righetti, Aldo, 5,161,050, Cl. 359-341.000.
Rising, Peter E.; and Chaconas, Peter G. Vial with powdered reagent. 5,159,799, Cl. 53-433.000.
Riso Kagaku Corporation: *See—*
Hasegawa, Takanori; and Ikejima, Shoichi, 5,160,564, Cl. 156-231.000.
Ritzmann, James M., to Tyton Corporation. Duct transition converter and flexible connectors including same. 5,160,811, Cl. 174-68.300.
Rizzi, John J.: *See—*
Rorke, A. Brooks; Bullwinkle, Wallace C.; Stephens, William I.; Reuter, Robert E.; and Rizzi, John J., 5,160,188, Cl. 312-196.000.
RMO, Inc.: *See—*
Peterson, Jeffrey A., 5,160,261, Cl. 433-8.000.
Robbins, Michael, to Lam Research Corporation. Method of end point detection in a plasma etching process. 5,160,576, Cl. 156-626.000.
Robert Bosch GmbH: *See—*
Eyermann, Manfred; and Weigt, Josef, 5,159,908, Cl. 123-179.100.
Kehl, Georg, 5,159,871, Cl. 91-422.000.
Klein, Hermann-Josef; Adam, Klaus; and Wuerth, Juergen, 5,159,912, Cl. 123-481.000.
Schramm, Guenter; Kohl, Walter; and Meyer, Friedhelm, 5,160,881, Cl. 322-7.000.

Robertshaw Controls Company: *See*—
Riehl, Fred, 5,160,256, Cl. 431-266.000.
Sigler, Kent K., 5,160,255, Cl. 431-266.000.
Robertson, Iain C., to Texas Instruments, Incorporated. Register write bit protection apparatus and method. 5,161,122, Cl. 365-195.000.
Robertsson, Gosta, to Alfa-Laval Separation AB. Centrifugal separator with pumping means, arranged to accomplish a circulating flow. 5,160,309, Cl. 494-43.000.
Robinson, Andrew L.: *See*—
Carson, Paul L.; Fitting, Dale W.; Robinson, Andrew L.; and Terry, Fred L., Jr., 5,160,870, Cl. 310-339.000.
Robinson, Randy S.: *See*—
Mohler, David B.; and Robinson, Randy S., 5,161,083, Cl. 361-143.000.
Rock, Erich: *See*—
Brustle, Klaus; Tofferl, Andreas; and Rock, Erich, 5,159,740, Cl. 16-258.000.
Rodkey, L. Scott: *See*—
Huff, G. David; and Rodkey, L. Scott, 5,160,594, Cl. 204-182.900.
Rodriguez-Cavazos, Enrique; Gleim, Gunter; and Chauvin, Jacques, to Thomson Consumer Electronics, Inc. Convergence control system for multiple vertical formats. 5,161,002, Cl. 358-140.000.
Rodson, Marius: *See*—
Scher, Herbert B.; and Rodson, Marius, 5,160,529, Cl. 71-118.000.
Roehl, James S., to United States of America, Navy. Hot water storage tank for solar collectors. 5,159,918, Cl. 126-437.000.
Rogers, Dean V.: *See*—
Helling, Robert W.; Helling, Daniel J.; and Rogers, Dean V., 5,159,895, Cl. 119-3.000.
Rohde, Meta; and Joshi, Shankar R., to Synergy Microwave Corporation. Universal surface mount package. 5,160,810, Cl. 174-52.400.
Rohe, Fred P.; and Bell, Bret, to Environmental Protection, Inc. Waterway liner. 5,160,221, Cl. 405-270.000.
Rohm Co., Ltd.: *See*—
Nakamura, Akira, 5,161,071, Cl. 360-46.000.
Rohm and Haas Company: *See*—
Ghosh, Tirthankar; and Mattox, John R., 5,160,526, Cl. 71-67.000.
Law, Andrew B.; and Willingham, Gary L., 5,160,527, Cl. 71-67.000.
Romheld GmbH: *See*—
Fischer, David; and Kohlert, Rudolf, 5,160,151, Cl. 279-121.000.
Roquette Freres: *See*—
Serpelloni, Michel; and Lemay, Patrick, 5,160,680, Cl. 264-126.000.
Rorden, Louis H.: *See*—
Dailey, Patrick E.; Barron, Charles D.; and Rorden, Louis H., 5,160,925, Cl. 340-853.300.
Rorke, A. Brooks; Bullwinkle, Wallace C.; Stephens, William I.; Reuter, Robert E.; and Rizzi, John J., to Westinghouse Electric Corp. Furniture stanchions with unitary power routing system. 5,160,188, Cl. 312-196.000.
Roschmann, Peter K. H., to U.S. Philips Corp. Magnetic resonance examination apparatus using a dielectric resonator. 5,160,890, Cl. 324-314.000.
Rose, James P.; and Phillips, Norville W. Spray gun trigger guard apparatus. 5,160,092, Cl. 239-288.500.
Roseman, Michael R.: *See*—
Bricker, James C.; Ebbeler, Robert E.; and Roseman, Michael R., 5,160,709, Cl. 422-263.000.
Rosenberg, Allen T. Tripod table. 5,159,883, Cl. 108-111.000.
Rossiter, Anthony L., to Vergola International Pty. Ltd. End cap for louvre. 5,159,783, Cl. 49-403.000.
Rossow, Harold E.: *See*—
Pyzik, Aleksander J.; Rossow, Harold E.; Schwarz, Douglas B.; Beaman, Donald R.; Pyzik, Barbara M.; and Dubensky, William J., 5,160,508, Cl. 51-307.000.
Rothfuss, Hans; Metzger, Herbert; Winkelman, Manfred; Winkler, Hans G.; and Kopia, Jochen, to Didier-Werke AG. Gas flushing apparatus for metallurgical vessel. 5,160,478, Cl. 266-200.000.
Rothleitner, Hubert: *See*—
Leipold, Ludwig; Rothleitner, Hubert; Sander, Rainald; and Tihanyi, Jenoe, 5,160,862, Cl. 307-571.000.
Rotman, Frederic; Rancon, Yannick; Queille, Philippe; and Olivier, Michel, to L'Air Liquide, Societe Anonyme Pour L'Etude Et L'Exploitation Des Procedes Georges Claude. Process for the metallization of ceramics and apparatus for carrying out the process. 5,160,765, Cl. 427-229.000.
Rowlett, Don C., to Kennametal Inc. Agricultural insert. 5,159,985, Cl. 172-723.000.
Roy F. Weston, Inc.: *See*—
Metzer, Nancy; and Corbin, Michael, 5,160,217, Cl. 405-128.000.
Roy, Maria J.; and Cohen, Cornelius B., Jr. Decorative article such as a cornice, valance or lambrequin. 5,159,965, Cl. 160-38.000.
Rubin, Jacob N., to Stone & Webster Engineering Corp. Apparatus and process for fluid-fluid contact. 5,160,623, Cl. 210-634.000.
Ruderman, Stephen: *See*—
Adamski, Maximilian, Jr.; Ruderman, Stephen; and Tegel, Robert G., 5,159,874, Cl. 112-262.300.
Rudziak, Mark K.: *See*—
Wong, James; and Rudziak, Mark K., 5,160,550, Cl. 148-96.000.
Wong, James; Rudziak, Mark K.; and Capone, Donald W., II., 5,160,794, Cl. 428-661.000.
Rukavina, Thomas G., to PPG Industries, Inc. Electrochromic window with metal grid counter electrode and acidic polyelectrolyte. 5,161,048, Cl. 359-275.000.
Runaldue, Thomas J., to Advanced Micro Devices, Inc. Input transition responsive CMOS self-boost circuit. 5,160,860, Cl. 307-482.000.
Runyon, V. Paul: *See*—
Czerwiec, Richard M.; Tyrrell, Raymond E.; Sanders, Gus C.; Sutherland, Joseph E.; Sanders, Richard J., Jr.; Hurlocker, Claude M.; Thorne, Hal A.; Runyon, V. Paul; and Aro, Enn, 5,161,152, Cl. 370-84.000.
Russo, Vincenzo. Modular apparatus used for the orderly display, in particular, of advertising fliers accompanying videocassettes, videocassettes themselves, or like materials. 5,160,050, Cl. 211-40.000.
Rusyniak, Michael F. Combination table and leg rest for reclining chair. 5,160,183, Cl. 297-153.000.
Ruther, Horst: *See*—
Marsoner, Hermann; and Ruther, Horst, 5,160,420, Cl. 204-433.000.
Ruyten, Henricus: *See*—
Hodulik, Wolfgang; and Ruyten, Henricus, 5,161,239, Cl. 360-137.000.
Ryan, Thomas W.: *See*—
Hutcheson, Timothy L.; Or, Wilson; Narayanan, Venkatesh; Mohan, Subramaniam; Wohlmut, Peter G.; Srinivasan, Ramanujam; Hunt, Bobby R.; and Ryan, Thomas W., 5,161,204, Cl. 382-16.000.
Rylander, Karen S.; Fant, Karl M.; and Egli, Werner H., to Honeywell Inc. Data projection system with compensation for nonplanar screen. 5,161,013, Cl. 358-160.000.
Rymarczyk, James W.: *See*—
Baum, Richard I.; Brotman, Charles H.; and Rymarczyk, James W., 5,161,156, Cl. 371-7.000.
Ryobi Motor Products Corp.: *See*—
Niemela, Paul W., 5,160,867, Cl. 310-154.000.
Rypacek, Frantisek: *See*—
DeLuca, Patrick P.; and Rypacek, Frantisek, 5,160,745, Cl. 424-487.000.
Ryuo, Toshihiko: *See*—
Tanno, Masayuki; Watanabe, Toshiaki; and Ryuo, Toshihiko, 5,161,049, Cl. 359-281.000.
S.N.C. Livbag: *See*—
Castagner, Bernard; Cord, Paul-Philippe; Doin, Bernard; and Kozyreff, Michel, 5,160,163, Cl. 280-740.000.
Sabatelli, Anthony D.; and Spirnak, Josephine A., to Procter & Gamble Company, The. Sunscreen agents, sunscreen compositions and methods for preventing sunburn. 5,160,731, Cl. 424-59.000.
Sackner, Joathan D.: *See*—
Sackner, Marvin A.; and Sackner, Joathan D., 5,159,935, Cl. 128-721.000.
Sackner, Marvin A.; and Sackner, Joathan D., to Nims, Inc. Non-invasive estimation of individual lung function. 5,159,935, Cl. 128-721.000.
Sacmi Cooperativa Meccanici Imola S.c.r.l.: *See*—
Alieri, Rodiero, 5,160,018, Cl. 198-803.600.
Sadaoka, Yoshihiko: *See*—
Sakai, Yoshirou; Sadaoka, Yoshihiko; Matsuguchi, Masanobu; Kuroiwa, Takaaki; and Abe, Tooru, 5,161,085, Cl. 361-286.000.
Saeki, Hiroshi; and Motoyama, Hatsuo, to Anritsu Corporation. Voltage controlled oscillator with controlled capacitance ratio in positive feedback loop to broaden bandwidth. 5,160,902, Cl. 331-117.00R.
Safford, Sarah E.: *See*—
Brown, William E., III; Safford, Sarah E.; and Clemens, John M., 5,160,701, Cl. 422-56.000.
Sagawa, Norihisa: *See*—
Niinai, Yoshitaka; Sagawa, Norihisa; Kawai, Yasuhiro; Igarashi, Sadato; and Ohyama, Hisanobu, 5,160,876, Cl. 318-460.000.
Sagawa, Tetsuya; Aoyama, Koji; and Oshima, Muneo, to AMP Incorporated. Double lock connector. 5,160,279, Cl. 439-595.000.
Saggese, Luigi, to Iveco, Fiat S.p.A. Method of assembling heavy motor vehicles. 5,159,746, Cl. 29-467.000.
Sagner, Klaus-Peter: *See*—
Hoppe, Manfred; Wiegner, Dieter; Sagner, Klaus-Peter; Jordan, Heinz D.; and Brandt, Horst, 5,160,348, Cl. 8-639.000.
Sahota, Harvinder. Balloon catheters. 5,160,321, Cl. 604-96.000.
Saidman, Laurence B.; and Smith, James C., to Nordson Corporation. Apparatus for forming a permanent foam coating by atomization onto a substrate. 5,159,894, Cl. 118-300.000.
St-Germain, Andre , to Gestion des brevets Fraco limitee. Self-raising work platform assembly. 5,159,993, Cl. 182-82.000.
Saito, Akihiro, to Hitachi, Ltd. Oil-cooled alternator. 5,160,864, Cl. 310-54.000.
Saito, Atsushi; Ojima, Masahiro; and Ito, Masaru, to Hitachi, Ltd. Magneto-optical disc memory apparatus including a header signal and magneto-optical signal level adjusting circuit. 5,161,135, Cl. 369-13.000.
Saito, Chuichi: *See*—
Iyoda, Hiroumi; Saito, Chuichi; Shiina, Mamoru; and Fujii, Yoshitaka, 5,160,009, Cl. 198-337.000.
Saito, Hiroshi, to Fuji Xerox Corporation, Ltd. Image processing system and method for processing documents in accordance with a job control sheet. 5,161,037, Cl. 358-468.000.
Saito, Kimitaka; Matsumoto, Tatsuyoshi; and Igashira, Toshihiko, to Nippon Soken, Inc. Fuel injector. 5,159,915, Cl. 123-557.000.
Saito, Masao: *See*—
Sugiura, Kiyohiko; Miki, Nobuaki; Nasu, Takeshi; Sugiura, Masayuki; and Saito, Masao, 5,160,116, Cl. 251-129.140.
Saito, Norikazu: *See*—
Matsuo, Makoto; Utsumi, Minoru; Ogusu, Chihaya; Mukasa, Shunsuke; Kudo, Yoshiaki; Obata, Hiroyuki; Aono, Takashi; Mohri, Hiroshi; Koike, Masato; Amano, Hideaki; and Saito, Norikazu, 5,161,233, Cl. 355-218.000.

Saito, Takayoshi: *See*—
Arai, Tatsuo; Nakayama, Masaaki; and Saito, Takayoshi, 5,160,228, Cl. 407-32.000.

Saito, Yoshinori: *See*—
Morishita, Yoshii; Sugimoto, Yasushi; Hayashida, Shigeru; Ishikawa, Hiroko; Noda, Yoshiaki; Murakami, Shigeru; Sato, Munehiro; Saito, Yoshinori; Kurata, Naoji; and Sugita, Yoshio, 5,160,487, Cl. 430-59.000.

Saitoh, Kenji; Matsugu, Masakazu; and Abe, Naoto, to Canon Kabushiki Kaisha. Device for detecting the relative position between opposed first and second objects. 5,160,848, Cl. 250-548.000.

Saitoh, Susumu: *See*—
Ohshima, Minoru; Morio, Shuichi; Saitoh, Susumu; Namikawa, Osamu; Obara, Kazutoshi; Seino, Minoru; Mochizuki, Takeshi; Nakura, Makoto; Arimoto, Akira; and Kasai, Masuo, 5,161,046, Cl. 359-212.000.

Sakaguchi, Masahide: *See*—
Miyazawa, Toshiki; Sakaguchi, Masahide; and Okabe, Hideki, 5,159,826, Cl. 72-358.000.

Sakai Chemical Industry Co., Ltd.: *See*—
Yoshimoto, Masafumi; Nakatsuji, Tadao; Nagano, Kazuhiko; and Tatsu, Tetsuo, 5,160,586, Cl. 204-59.00R.

Sakai, Isamu: *See*—
Tonariya, Yoshito; Wada, Yukihito; Yamaguchi, Kazuhiro; Yamazaki, Tomio; Sakai, Isamu; Yokoi, Shigeru; Togashi, Mitsuo; and Noguchi, Yukihiro, 5,160,724, Cl. 424-4.000.

Sakai, Toru: *See*—
Hartman, Robert A.; and Sakai, Toru, 5,161,237, Cl. 359-54.000.

Sakai, Yoshihiro: *See*—
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.

Sakai, Yoshirou; Sadaoka, Yoshihiko; Matsuguchi, Masanobu; Kuroiwa, Takaaki; and Abe, Tooru, to Yamatake-Honeywell Co., Ltd. Moisture sensitive element and method of manufacturing the same. 5,161,085, Cl. 361-286.000.

Sakakibara, Hiroki: *See*—
Sasaki, Masatomi; Kashiwagi, Nobuyoshi; Sakakibara, Hiroki; and Saruhashi, Makoto, 5,160,672, Cl. 264-41.000.

Sakakibara, Hisayoshi: *See*—
Ohishi, Shigeji; Honda, Shin; Sakakibara, Hisayoshi; and Fujiwara, Kenichi, 5,159,820, Cl. 62-468.000.

Sakakibara, Noriyuki, to Kawai Gakki Seisakusho Co., Ltd. Regulating rule for grand pianos. 5,159,762, Cl. 33-832.000.

Sakakibara, Yasushi: *See*—
Toraguchi, Makoto; Katagiri, Genichi; and Sakakibara, Yasushi, 5,160,152, Cl. 279-128.000.

Sakamoto, Junichi: *See*—
Welt, Sydney; Divgi, Chaitanya R.; Yeh, Samual; Old, Lloyd J.; Oettgen, Herbert F.; Real, Francisco X.; and Sakamoto, Junichi, 5,160,723, Cl. 424-1.100.

Sakamoto, Susumu: *See*—
Okada, Hiroki; Mitsuhashi, Hiroshi; and Sakamoto, Susumu, 5,160,253, Cl. 418-55.200.

Sakuma, Atsushi: *See*—
Hamada, Mitsuo; Sakuma, Atsushi; and Shimizu, Koji, 5,160,670, Cl. 264-6.000.

Sakuma, Mikio: *See*—
Takagi, Yukihito; Imamaki, Teruo; Nakata, Shigeru; and Sakuma, Mikio, 5,160,573, Cl. 156-510.000.

Sakurai, Chikako: *See*—
Sakurai, Mikio; and Sakurai, Chikako, 5,160,214, Cl. 405-36.000.

Sakurai, Mikio; and Sakurai, Chikako. Irrigation system and irrigation method. 5,160,214, Cl. 405-36.000.

Salerno, David M.: *See*—
Zanetti, John M.; and Salerno, David M., 5,159,932, Cl. 128-696.000.

Sales, Charles R. Retainer for pre-hung door. 5,159,782, Cl. 49-380.000.

Salzman, Michael: *See*—
Deugo, L. Scott; Mansfield, Andrew; Salzman, Michael; von Huene, Bernhard; and von Huene, Eberhard, 5,159,793, Cl. 52-126.100.

Samsung Electronics Co., Ltd.: *See*—
Choi, Hoon-Sun, 5,161,012, Cl. 358-183.000.
Kim, Jeong-Hoon, 5,161,016, Cl. 358-166.000.
Lee, Jeong-Woo, 5,160,861, Cl. 307-530.000.
Woo, Haeng-Cho, 5,160,207, Cl. 400-697.100.

Samsung Electronics Co., Ltd: *See*—
Song, Tong-Ill, 5,161,030, Cl. 358-310.000.

San-ai Oil Co. Ltd.: *See*—
Totsuka, Nobuo; Kimura, Mitsuo; Kurisu, Takao; Mishiro, Yuji; Sengan, Masakazu; Ishizawa, Katsunobu; Kashihara, Shigemitsu; Kanazawa, Minoru; and Komatu, Nagahiro, 5,160,590, Cl. 204-141.500.

Sand, William F., to Hydro Systems Company. Chemical eductor with integral elongated air gap. 5,159,958, Cl. 137-888.000.

Sander, Rainald: *See*—
Leipold, Ludwig; Rothleitner, Hubert; Sander, Rainald; and Tihanyi, Jenoe, 5,160,862, Cl. 307-571.000.

Sanderlin, F. Dave: *See*—
Gunnerson, Fred S.; Sanderlin, F. Dave; Iurato, Joy R.; and Padilla, Antonio A., 5,159,972, Cl. 165-32.000.

Sanders, Edward B.: *See*—
Hayward, Charles R.; Lanzillotti, Harry V.; Merrill, David E.; Sanders, Edward B.; Losee, D. Bruce, Jr.; and Hearn, John R., 5,159,940, Cl. 131-194.000.

Sanders, Gus C.: *See*—
Czerwiec, Richard M.; Tyrrell, Raymond E.; Sanders, Gus C.; Sutherland, Joseph E.; Sanders, Richard J., Jr.; Hurlocker, Claude M.; Thorne, Hal A.; Runyon, V. Paul; and Aro, Enn, 5,161,152, Cl. 370-84.000.

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Thaler, Arnold; Saud, Ivan; and Yip, P. C., 5,160,831, Cl. 219-506.000.
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Schneider, Dean J., to GKN Automotive, Inc. Telescopic triplan universal joint bearing retaining spring. 5,160,298, Cl. 464-111.000.
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Christie, Nancy J.; and Schotter, Daniel K., 5,161,208, Cl. 385-128.000.
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Kicherer, Robert; and Schreder, Felix, 5,160,830, Cl. 219-458.000.
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Schulz, William J., Jr.: *See*—
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Scovil, Brian J.; and Pepin, Henry J., 5,160,559, Cl. 156-73.600.
Scott, Bryan F.: *See*—
Merriam, David P.; Scott, Dale L.; and Scott, Bryan F., 5,161,182, Cl. 379-107.000.
Scott, Dale L.: *See*—
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SCS Mobilecom, Inc.: *See*—
Schilling, Donald L., 5,161,168, Cl. 375-1.000.
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Leyden, Roger J.; and Surma, Terrance, 5,160,048, Cl. 211-7.000.
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Forbord, Kent J.; and Haidari, Mehdi S., 5,161,074, Cl. 360-97.010.
Jabbari, Iraj, 5,161,077, Cl. 360-106.000.
Seda, Milan J., to Mattel, Inc. Convertible toy table. 5,160,288, Cl. 446-482.000.
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Nitta, Yukuo, 5,161,234, Cl. 351-52.000.
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Zanetti, John M.; and Salerno, David M., 5,159,932, Cl. 128-696.000.
Seitz, Robert F., to Gen-Tech, Inc. Polymer wheel chock for use on vehicle transport carriers. 5,160,223, Cl. 410-9.000.
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Pernelle, Robert; and Agius, Michel, 5,160,524, Cl. 65-268.000.
Selco S.r.l.: *See*—
Tagliaferri, Renzo, 5,159,869, Cl. 83-862.000.
Sellstrom Manufacturing Company: *See*—
Siegal, Burton L., 5,160,699, Cl. 422-24.000.
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Serpelloni, Michel; and Lemay, Patrick, to Roquette Freres. Method for the preparation of directly compressible granular manitol. 5,160,680, Cl. 264-126.000.
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Sexton, Walter, to Lyemance International, Inc. Chimney damper. 5,160,291, Cl. 454-7.000.
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Seydel, Matthew H.; and Seydel, Katherine G., 5,160,154, Cl. 280-47.190.
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Seyer, Jerome M.: *See*—
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McClure, David C.; and Coker, Thomas A., 5,161,159, Cl. 371-22.100.
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Bellezza, Orio, 5,160,986, Cl. 257-316.000.
Martignoni, Fabrizio; Diazzi, Claudio; Pidutti, Albino; and Vio, Fabio, 5,160,854, Cl. 307-264.000.
Shafer, David; and Powell, Ian, to General Signal Corporation. Optical projection system including a refractive lens assembly having a gap between constituent lenses. 5,161,062, Cl. 359-785.000.
Shafer, Richard L.; and Mackall, Allen E., to Buckeye Manufacturing Company. Dedimpling apparatus. 5,159,825, Cl. 72-111.000.
Shakkottai, Parthasarathy; Kwack, Eug Y.; and Back, Lloyd, to United States of America, National Aeronautics and Space Administration. Acoustic device and method for measuring gas densities. 5,159,843, Cl. 73-24.050.
Shakushi, Koji: *See*—
Yamada, Motohiro; Yamamoto, Mineo; and Shakushi, Koji, 5,160,968, Cl. 355-208.000.
Shanholtz, Carl E.: *See*—
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Matsuda, Eichika; Murata, Kaoru; and Okuda, Yoshihiro, 5,161,118, Cl. 364-744.000.
Nakayama, Junichiro; Kimura, Kazuhiro; Katayama, Hiroyuki; and Ohta, Kenji, 5,160,572, Cl. 156-510.000.
Narutaki, Yozo; and Nakagawa, Kenichi, 5,161,043, Cl. 359-54.000.
Tonegawa, Tadashi, 5,160,967, Cl. 355-208.000.
Shell Offshore Inc.: *See*—
Lohr, Curtis J.; and Huete, David A., 5,159,891, Cl. 114-230.000.
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Khouw, Frank H. H.; Spiessens, Marinus J.; Nieskens, Martin J. P. C.; and Woudstra, Jouke J., 5,160,706, Cl. 422-140.000.
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Sheu, Yu-Hwa E.: *See*—
Marquis, Edward T.; Speranza, George P.; Sheu, Yu-Hwa E.; Culbreth, William K., III; and Pottratz, David G., 5,160,587, Cl. 203-64.000.
Shibano, Yoshizo: *See*—
Higuchi, Harukazu; and Shibano, Yoshizo, 5,161,252, Cl. 455-78.000.
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Shibata, Tadashi: *See*—
Ohmi, Tadahiro; Kawakami, Michiya; Shibata, Tadashi; and Umeda, Masaru, 5,160,429, Cl. 210-137.000.
Shibazaki, Mitsuhiro: *See*—
Yoshida, Hiroshi; Shibazaki, Mitsuhiro; Kubo, Hiroaki; and Jinbo, Shunji, 5,160,220, Cl. 405-236.000.
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Yamamoto, Kiyoshi; Kuwabara, Tetsuo; Shigyo, Isamu; Ohmori, Masaki; and Yoshimura, Fumitaka, 5,160,362, Cl. 65-102.000.
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Iyoda, Hiroumi; Saito, Chuichi; Shiina, Mamoru; and Fujii, Yoshitaka, 5,160,009, Cl. 198-337.000.
Shiina, Yoshio; Kato, Akihiko; Isosu, Toru; Kanno, Makoto; and Sato, Akihiko, to Fuji Xerox Corporation, Ltd. Apparatus for detecting toner shortage in developing unit. 5,160,966, Cl. 355-206.000.
Shima, Akihiro; and Ishiki, Kunihiko, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser. 5,161,166, Cl. 372-45.000.
Shimano Industrial Co., Ltd.: *See*—
Furomoto, Yoshiyuki, 5,160,099, Cl. 242-321.000.
Shimawaki, Hidenori, to NEC Corporation. Heterojunction bipolar transistor with improved base layer. 5,160,994, Cl. 257-190.000.
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Shimizu Co., Ltd.: *See*—
Nishimura, Shigefumi; Fukuda, Masao; and Shimizu, Yoshiji, 5,160,422, Cl. 205-254.000.

Shimizu, Hiroshi: *See*—
Yukumoto, Masao; Ozawa, Michiharu; Ishii, Kazuhide; and Shimizu, Hiroshi, 5,160,390, Cl. 148-325.000.

Shimizu, Isamu: *See*—
Ishihara, Shunichi; Hirooka, Masaaki; Hanna, Jun-Ichi; and Shimizu, Isamu, 5,160,543, Cl. 118-715.000.

Shimizu, Kenichi: *See*—
Kobayashi, Kenzo; Shimizu, Kenichi; and Yoshioka, Hideaki, 5,160,599, Cl. 205-106.000.

Shimizu, Koji, to Dow Corning Toray Silicone Co., Ltd. Method for the preparation of heterogeneous silicone rubber moldings. 5,160,681, Cl. 264-128.000.

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Hamada, Mitsuo; Sakuma, Atsushi; and Shimizu, Koji, 5,160,670, Cl. 264-6.000.

Shimizu, Shoichi: *See*—
Kataoka, Shigeru; and Shimizu, Shoichi, 5,160,858, Cl. 307-450.000.

Shimizu, Tetsuo: *See*—
Mihira, Hiroshi; Shimizu, Tetsuo; Hirahara, Kazuhiro; Ishihara, Toshinobu; and Takaya, Seiki, 5,160,542, Cl. 118-715.000.
Tanno, Masayuki; Watanabe, Toshiaki; and Ryuo, Toshihiko, 5,161,049, Cl. 359-281.000.
Urabe, Yoshihiko; and Ohba, Toshio, 5,159,879, Cl. 101-465.000.

Shinada, Hiroyuki: *See*—
Todokoro, Hideo; Shinada, Hiroyuki; and Fukuhara, Satoru, 5,160,884, Cl. 324-158.00R.

Shinkai, Masahiro: *See*—
Namba, Kenryo; Shinkai, Masahiro; Tezuka, Sinichi; Inoue, Tetsushi; Aoi, Toshiki; and Takayama, Suguru, 5,161,150, Cl. 369-275.400.

Shirahama, Katsunori: *See*—
Hara, Toshiyuki; and Shirahama, Katsunori, 5,159,892, Cl. 116-28.100.

Shiraishi, Motoatsu; Nagamitsu, Tatsuo; and Nakamura, Mitsuki, to Honda Giken Kogyo Kabushiki Kaisha. Transferring apparatus for transfer press. 5,159,827, Cl. 72-405.000.

Shiraishi, Yasuhiro; and Ishikawa, Yasuki, to Nissan Motor Company, Limited. Vehicle dynamic characteristic control apparatus. 5,161,106, Cl. 364-424.050.

Shirasawa, Toshihiko: *See*—
Yoshida, Tsutomu; Inoue, Toshinori; Shirasawa, Toshihiko; and Asahina, Takashi, 5,160,479, Cl. 266-233.000.

Shirota, Atsushi, to Minolta Camera Co., Ltd. Image projecting apparatus. 5,160,958, Cl. 355-45.000.

Shishido, Takayasu: *See*—
Watanabe, Kenji; Sekiguchi, Tetsuo; and Shishido, Takayasu, 5,160,956, Cl. 354-286.000.

Shlesinger, B. Edward, Jr.: *See*—
McCormick, Robert J.; Zimmerman, James C.; and Shlesinger, B. Edward, Jr., 5,160,082, Cl. 229-134.000.

Shmidt, Creston D.; and Stobby, William G., to Dow Chemical Company, The. Fire-resistant thermoplastic composite structure. 5,160,784, Cl. 428-316.600.

Shuler, Donald K., to Linvatec Corporation. Surgical cutting instrument with ceramic coating on an inner tubular member. 5,160,318, Cl. 604-22.000.

Shur, Michael; and Lee, Kwyro, to University of Virginia Alumni Patents Foundation. Field-effect compound semiconductive transistor with GaAs gate to increase barrier height and reduce turn-on threshold. 5,161,235, Cl. 257-24.000.

Sibley, Barry; and Char, Aka L. Leak-proof cylindrical container for the transport of diagnostic specimens or dangerous substances. 5,160,021, Cl. 206-204.000.

Sicard, Thierry M. A.: *See*—
Guerra, Daniel; and Sicard, Thierry M. A., 5,161,112, Cl. 364-483.000.

Siddoway, Ronald T.; and Estrick, Vaughn H., to Hughes Aircraft Company. MMIC amplifier with extended dynamic range and low distortion. 5,160,895, Cl. 330-151.000.

Siecor Corporation: *See*—
Ott, Michael J.; Bazemore, Jeffrey T.; and Brogley, Mark E., 5,160,569, Cl. 156-439.000.

Siegal, Burton L., to Sellstrom Manufacturing Company. Germicidal apparatus. 5,160,699, Cl. 422-24.000.

Siegel, Jeffrey I.; and Braginsky, Sidney, to Flow Science, Inc. Closed sample cell for use in flow cytometry. 5,160,974, Cl. 356-246.000.

Siemens Aktiengesellschaft: *See*—
Barre, Claude, 5,160,857, Cl. 307-446.000.
Franke, Joachim; Kefer, Volker; and Wittchow, Eberhard, 5,159,897, Cl. 122-367.300.
Guerra, Daniel; and Sicard, Thierry M. A., 5,161,112, Cl. 364-483.000.
Leipold, Ludwig; Rothleitner, Hubert; Sander, Rainald; and Tihanyi, Jenoe, 5,160,862, Cl. 307-571.000.
Ljungstroem, Jan, 5,159,926, Cl. 128-419.0PG.
Zell, Karl; and Thom, Guenter, 5,160,272, Cl. 439-101.000.

Siemens Automotive L.P.: *See*—
Daly, Paul D., 5,160,691, Cl. 264-334.000.

Sierra, George H.: *See*—
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,979, Cl. 356-423.000.
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Sigler, Kent K., to Robertshaw Controls Company. Burner construction and igniter assembly therefor. 5,160,255, Cl. 431-266.000.

Silber, Gerard; and Renner, Gilles, to Societe de Fabricaiton d'Instruments de Mesure. Apparatus for gauging high pressure gas, in particular the supply of oxygen gas on board an aircraft. 5,159,839, Cl. 73-714.000.

Silica Gel Gesellschaft mbH Adsorptions-Technik, Apparatebau: *See*—
Pilgrimm, Herbert, 5,160,725, Cl. 424-9.000.

Simon, Tim; and Tong, Lee, to Honeywell Inc. Electronic timer switch with time tracker. 5,160,853, Cl. 307-140.000.

Simons, Robert E.: *See*—
Chu, Richard C.; Ellsworth, Michael J., Jr.; Goth, Gary F.; Simons, Robert E.; and Zumbrunnen, Michael L., 5,161,089, Cl. 361-385.000.

Simpson, Donald C.: *See*—
Prescott, Robert C.; Simpson, Donald C.; Sanford, Philip H.; and Nudd, Howard W., 5,159,949, Cl. 137-84.000.

Simpson, Stephen M.: *See*—
Woodward, Antony I.; and Simpson, Stephen M., 5,160,777, Cl. 428-172.000.

Simpson Strong-Tie Company, Inc.: *See*—
Gilb, Tyrell T., 5,160,211, Cl. 403-231.000.

Simpson, Vandell E., III, to Manchester Tool Company. Adjustable face grooving tool holder. 5,159,863, Cl. 82-1.110.

Sims, Cecil R. Self retracting portable cattle guard. 5,160,120, Cl. 256-17.000.

Sims, Stephen F.: *See*—
Thorp, Phil D.; and Sims, Stephen F., 5,159,987, Cl. 173-176.000.

Singh, Raj N.; and Gaddipati, Achuta R., to General Electric Company. Fibrous material-containing composite. 5,160,676, Cl. 264-60.000.

Sintov, Amnon: *See*—
Friedman, Michael; and Sintov, Amnon, 5,160,737, Cl. 424-401.000.

Siomkos, John R.; and Huang, Philip M., to Motorola, Inc. Microstripe filter having edge flared structures. 5,160,906, Cl. 333-204.000.

Siriporn, Charn; Milcarek, Charles S., Jr.; Norman, Ronald J.; Baum, Randon L.; and Holecek, Michael G., to Ward Holding Company, Inc. Sheet stacking. 5,160,129, Cl. 271-178.000.

Sissala, Mikko; and de Jong, Johannes, to Kone Elevator GmbH. Safety gear for an elevator. 5,159,995, Cl. 187-88.000.

Sitter, Matthew J. Reflector-ornament holder for vehicle wheels. 5,161,056, Cl. 359-533.000.

Skeels, Gary W.: *See*—
Vassilakis, James G.; Best, Donald F.; Skeels, Gary W.; and Flanigen, Edith M., 5,160,033, Cl. 208-111.000.

SKF GmbH: *See*—
Winter, Heinrich, 5,159,742, Cl. 29-129.000.

Skocic, Ante; and Presenius, Jurgen, to Passavant-Werke AG. Lifting support frame for a filter press. 5,160,612, Cl. 210-230.000.

Sloan-Kettering Institute For Cancer Research: *See*—
Welt, Sydney; Divgi, Chaitanya R.; Yeh, Samual; Old, Lloyd J.; Oettgen, Herbert F.; Real, Francisco X.; and Sakamoto, Junichi, 5,160,723, Cl. 424-1.100.

Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, to Chevron Research and Technology Company. Monoalkylamine complexes of borated higher carbon number alkyl catechols and lubricating oil compositions containing the same. 5,160,650, Cl. 252-49.600.

Small, Vernon R , Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, to Chevron Research and Technology Company. Trialkylamine complexes of borated higher carbon number alkyl catechols and lubricating oil compositions containing the same. 5,160,651, Cl. 252-49.600.

Small, Vernon R., Jr.; Liston, Thomas V.; and Onopchenko, Anatoli, to Chevron Research and Technology Company. Dialkylamine complexes of borated higher carbon number alkyl catechols and lubricating oil compositions containing the same. 5,160,652, Cl. 252-49.600.

Smith, Alvin H. Elastic resistance exercise device having resistance element retaining structure. 5,160,303, Cl. 482-123.000.

Smith, Benjamin A.; and Burnett, Steven W., to Digital Telecommunications Systems, Inc. Ring-back powered telephone with nonvolatile memory structure. 5,161,184, Cl. 379-413.000.

Smith, Gaylord D.; Wendler, Walter H.; and O'Donnell, David B., to Inco Alloys International, Inc. Heater sheath alloy. 5,160,382, Cl. 148-327.000.

Smith International, Inc.: *See*—
Dailey, Patrick E.; Barron, Charles D.; and Rorden, Louis H., 5,160,925, Cl. 340-853.300.

Smith, James C.: *See*—
Saidman, Laurence B.; and Smith, James C., 5,159,894, Cl. 118-300.000.

Smith, Kim R.; Borland, James E.; Crutcher, Terry; and Sauer, Joe D., to Ethyl Corporation. Surfactant compositions. 5,160,658, Cl. 252-174.190.

Smith & Loveless, Inc.: *See*—
O'Reilly, David W., 5,160,610, Cl. 210-194.000.

Smith, Richard D., to West Point Pepperell. Water-soluble blends of active methylene compounds and polyhydric alcohols as formaldehyde scavengers. 5,160,503, Cl. 8-115.700.

Smith, Robert P.: *See—*
Konicek, Jiri D.; Smith, Robert P.; and Zeroth, Jerry C., 5,160,567, Cl. 156-288.000.

Smith, Stephen D.: *See—*
Liboff, Abraham R.; McLeod, Bruce R.; and Smith, Stephen D., 5,160,591, Cl. 204-155.000.

Smith, William A.; and Brodie, Eugene L., to Hughes Aircraft Company. Circuit card assembly conduction converter. 5,161,092, Cl. 361-387.000.

Smiths Industries Public Limited Company: *See—*
Cross, David E., 5,160,330, Cl. 604-339.000.

Snetting, Mark E.; Anderson, Steven A.; Price, Scott D.; and Sutton, David L., to Black & Decker Inc. Inflator/deflator accessory for air compressor. 5,159,961, Cl. 141-10.000.

Snyder, Edward A., to Hydroacoustics, Inc. Friction welder having an electromagnetic drive which produces orbital motion. 5,160,393, Cl. 156-73.500.

Snyder, Kenneth J.: *See—*
Frost, Jack G.; and Snyder, Kenneth J., 5,160,631, Cl. 210-720.000.

Snyder, Stephen L. Airfoil canopy aircraft. 5,160,100, Cl. 244-13.000.

So, Teruhiko: *See—*
Koizumi, Koreaki; So, Teruhiko; and Satio, Tetsuya, 5,160,531, Cl. 75-10.150.

Societe de Fabricaiton d'Instruments de Mesure: *See—*
Silber, Gerard; and Renner, Gilles, 5,159,839, Cl. 73-714.000.

Societe Europeenne de Propulsion: *See—*
Clais, Jean-Pierre; and Hermant, Eric, 5,159,809, Cl. 60-225.000.
Vives, Michel; and Limousin, Jean L., 5,160,471, Cl. 264-136.000.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.": *See—*
Burkarth, Nadine; Marty, Christian; and Rappart, Yvan, 5,159,970, Cl. 164-517.000.

Societe Nationale d'Etude et de Construction de Motors d'Aviation "S.N.E.C.M.A.": *See—*
Forestier, Alexandre, 5,159,807, Cl. 60-39.230.

Soderberg, Jan, to Exxon Chemical Patents Inc. Process of insulating a body cavity. 5,160,465, Cl. 264-46.500.

Sogawa, Fumihiro: *See—*
Hori, Yoshikazu; Yamamoto, Hiroaki; and Sogawa, Fumihiro, 5,161,148, Cl. 369-112.000.

Solco Hospital Products Group, Inc.: *See—*
Wells, John R., 5,160,333, Cl. 604-408.000.

Somerville, Dean S., to Posi Lock Puller, Inc. Hydraulic puller. 5,159,743, Cl. 29-252.000.

Somerville Packaging: *See—*
McCormick, Robert J.; Zimmerman, James C.; and Shlesinger, B. Edward, Jr., 5,160,082, Cl. 229-134.000.

Song, Tong-Il, to Samsung Electronics Co., Ltd. Method and circuit for enhancing image quality of a video tape recorder (VTR) using motion adaptive spectrum folding method. 5,161,030, Cl. 358-310.000.

Sony Corporation: *See—*
Funayama, Masanori; and Kikuchi, Shuichi, 5,161,080, Cl. 360-133.000.
Harradine, Vincent C., 5,161,005, Cl. 358-28.000.
Ito, Kengo, 5,160,371, Cl. 106-19.00R.
Kobayashi, Yuji; and Takamori, Tsutomu, 5,161,032, Cl. 358-326.000.
Machida, Tetsuo; and Yamazaki, Tatsuya, 5,161,081, Cl. 360-133.000.
Matsunaga, Osamu, 5,161,018, Cl. 358-167.000.
Mochizuki, Hidenobu, 5,161,123, Cl. 365-204.000.
Nagai, Yasuo; and Yoshihiro, Mitsugu, 5,161,209, Cl. 388-907.500.
Ogawa, Hiroshi; and Iimura, Shinichiro, 5,161,145, Cl. 369-59.000.
Suzuki, Hideto; Kurose, Yoshikazu; and Aoki, Shinji, 5,161,171, Cl. 375-108.000.
Terada, Akio, 5,161,140, Cl. 369-44.280.
Tomiyama, Takamichi; Nara, Hitoshi; and Adachi, Osamu, 5,161,067, Cl. 359-824.000.
Urayama, Kiyoshi; and Sato, Masanori, 5,160,752, Cl. 425-577.000.
Yanagida, Toshiharu, 5,160,398, Cl. 156-345.000.

Soong, Tsai C. Handle device for sports equipment shafts. 5,160,139, Cl. 273-81.00R.

Sota, Koichi: *See—*
Nakano, Haruo; and Sota, Koichi, 5,160,571, Cl. 156-505.000.

Southern Clay Products, Inc.: *See—*
Knudson, Milburn I., Jr.; and Jones, Thomas R., 5,160,454, Cl. 252-315.200.

Souza, Steven P.: *See—*
Schenck, John F.; Souza, Steven P.; and Eisner, David R., 5,159,930, Cl. 128-653.500.

Sowa, Hans C.: *See—*
Bray, Michelle M.; Bright, Michael W.; and Sowa, Hans C., 5,161,189, Cl. 380-21.000.

Spaeth, Vincent G.: *See—*
Kleefisch, Jeffery L.; and Spaeth, Vincent G., 5,160,632, Cl. 210-724.000.

Sparacino, Steven J.: *See—*
Makhija, Surender K.; Sparacino, Steven J.; and Burgess, Robert T., 5,160,892, Cl. 324-379.000.

Sparton Corporation: *See—*
Merriam, David P.; Scott, Dale L.; and Scott, Bryan F., 5,161,182, Cl. 379-107.000.
Yoon, Young S., 5,160,913, Cl. 340-388.000.

Spears, William E., Jr.: *See—*
Kirschner, Lawrence; Lajoie, Michael S.; and Spears, William E., Jr., 5,160,547, Cl. 134-7.000.

Spence, Clay D.: *See—*
Pearson, John C.; and Spence, Clay D., 5,161,014, Cl. 358-160.000.

Speranza, George P.: *See—*
Marquis, Edward T.; Speranza, George P.; Sheu, Yu-Hwa E.; Culbreth, William K., III; and Pottratz, David G., 5,160,587, Cl. 203-64.000.

Spicer, Barry K., to Storage Technology Corporation. Rotating compliant tape guide. 5,160,078, Cl. 226-190.000.

Spiegel, Armin; and Rebhandl, Wolfgang, to Leica Heerbrugg AG. Device for aligning a geodetic instrument over a defined position mark. 5,159,760, Cl. 33-227.000.

Spiess, Hansruedi; and Galvanetto, Francois, to Von Roll AG. Covering for a ground opening. 5,160,213, Cl. 404-25.000.

Spiessens, Marinus J.: *See—*
Khouw, Frank H. H.; Spiessens, Marinus J.; Nieskens, Martin J. P. C.; and Woudstra, Jouke J., 5,160,706, Cl. 422-140.000.

Spinney, Barry A.: *See—*
Lampson, Butler W.; Hawe, William R.; Gupta, Amar; and Spinney, Barry A., 5,161,193, Cl. 380-49.000.

Spiquel, Jacques M.: *See—*
Larreco, Michel M.; Spiquel, Jacques M.; and Tavernier, Herve, 5,159,969, Cl. 164-415.000.

Spirig, Walter J.; and Tetrault, Jacques, to Spirig, Walter J. Light beam interrupt detection apparatus for use in a vibrating environment. 5,160,850, Cl. 250-561.000.

Spirnak, Josephine A.: *See—*
Sabatelli, Anthony D.; and Spirnak, Josephine A., 5,160,731, Cl. 424-59.000.

Spitsin, Valentin M.; Karetnikov, Evgeny V.; Grishin, Sergei F.; Ivanov, Andrei A.; and Gorberg, Boris L., to Ivanovsky Nauchno-Issledovatelsky Experimentalno-Konstruktorsky Institut. Method for treatment of moving substrate by electric discharge plasma and device therefor. 5,160,592, Cl. 204-164.000.

Sprugel, Friedrich: *See—*
Schur, Hans; Angerer, Werner; and Sprugel, Friedrich, 5,160,506, Cl. 44-308.000.

Spry, Robert J., to United States of America, Air Force. Superconducting searching filter. 5,161,068, Cl. 359-885.000.

Square D Company: *See—*
Krom, Thomas J., 5,160,284, Cl. 439-797.000.

SRI Inc.: *See—*
Parkinson, Dean B.; and Bergren, Orton D., 5,160,369, Cl. 106-19.00R.

Srinivasan, Ramanujam: *See—*
Hutcheson, Timothy L.; Or, Wilson; Narayanan, Venkatesh; Mohan, Subramaniam; Wohlmut, Peter G.; Srinivasan, Ramanujam; Hunt, Bobby R.; and Ryan, Thomas W., 5,161,204, Cl. 382-16.000.

Staalkat B.V.: *See—*
Temming, Leonardus J., 5,160,019, Cl. 198-803.900.

Stafford, John W.: *See—*
Moore, Kevin D.; Stafford, John W.; Beckenbaugh, William M.; and Cholewczynski, Ken, 5,160,409, Cl. 156-656.000.

Stamps, Virgil O.: *See—*
Mayeaux, Paul H.; and Stamps, Virgil O., 5,161,107, Cl. 364-436.000.

Standard Oil Company, The: *See—*
Mazanec, Terry J.; and Velenyi, Louis J., 5,160,713, Cl. 423-210.000.

Stang, Howard J. Infant support and restraint system. 5,160,185, Cl. 297-377.000.

Stanley Aviation Corporation: *See—*
Gale, Edwin J., 5,160,176, Cl. 285-165.000.

Stapleton, Jeff T., to Calcomp Inc. Sensor for sensing media in a plotter. 5,161,246, Cl. 395-111.000.

Starrett, Paul D., to Monadnock Lifetime Products, Inc. Expandable baton with spring biased latch means. 5,160,140, Cl. 273-84.00R.

Stary, Gary M. Pipeline valve apparatus. 5,160,118, Cl. 251-173.000.

Stauffacher, James H.: *See—*
Kutchmarek, Darrell J.; and Stauffacher, James H., 5,160,563, Cl. 156-204.000.

STC PLC: *See—*
Dyer, Arthur J.; and Redman, Stephen C., 5,161,155, Cl. 370-110.100.
Walters, David L.; Healy, Martin; Marlow, Ernest C.; and Harrison, David F., 5,160,972, Cl. 356-32.000.
Westmore, Richard J., 5,161,153, Cl. 370-94.300.

Stec Inc.: *See—*
Mihira, Hiroshi; Shimizu, Tetsuo; Hirahara, Kazuhiro; Ishihara, Toshinobu; and Takaya, Seiki, 5,160,542, Cl. 118-715.000.

Steckel, Thomas F., to Lubrizol Corporation, The. High molecular weight nitrogen-containing condensates and fuels and lubricants containing same. 5,160,648, Cl. 252-47.500.

Steelcase, Inc.: *See—*
Faiks, Frederick S.; Anderson, Craig M.; and Bischoff, Daniel R., 5,160,184, Cl. 297-304.000.

Steiger, Ronald P.; and Leung, Peter K., to Exxon Production Research Company. Microaccumulator for measurement of fluid volume changes under pressure. 5,159,828, Cl. 73-38.000.

Stein Industrie: *See—*
Aubry, Jean; Teton, Andre; and Tessier, Jean-Paul, 5,160,516, Cl. 55-269.000.

Steinbach, Peter: *See—*
Goetz, Helmut; Scheibinger, Ludwig; and Steinbach, Peter, 5,160,460, Cl. 261-122.100.

Steinbacher, Karl; Schmidt, Hermann; and Leussler, Wilhelm, to Metallgesellschaft Aktiengesellschaft. Process and apparatus for purifying dust- and pollutant-containing exhaust gases. 5,160,510, Cl. 55-7.000.

Steinbiss, Joachim: *See*—
Schlipfenbacher, Reiner; Mangold, Dieter; Lerch, Rolf; and Steinbiss, Joachim, 5,160,486, Cl. 422-56.000.

Step Loc Corporation: *See*—
Hoopengardner, Merle R., 5,160,770, Cl. 428-40.000.

Stephens, William I.: *See*—
Rorke, A. Brooks; Bullwinkle, Wallace C.; Stephens, William I.; Reuter, Robert E.; and Rizzi, John J., 5,160,188, Cl. 312-196.000.

Stepper, Inc.: *See*—
Hannon, Charles N., 5,159,798, Cl. 53-415.000.

Stern, Richard A.: *See*—
Babbitt, Richard W.; and Stern, Richard A., 5,160,904, Cl. 333-34.000.

Steudtner, Werner. Fusion reactor. 5,160,694, Cl. 376-107.000.

Stevens, David P.: *See*—
Cherry, James R.; Stevens, David P.; and Raynus, Abel, 5,160,927, Cl. 340-904.000.

Stevens, Mikel R.: *See*—
Lund, Gary K.; and Stevens, Mikel R., 5,160,386, Cl. 149-88.000.

Stewart, Matthew M. Tools for repairing planetary gears. 5,159,744, Cl. 29-275.000.

Stewart, William H., Jr., to Milliken Research Corporation. Apparatus for high velocity dye drainage. 5,159,824, Cl. 68-205.00R.

Stewrat, John A., III: *See*—
Fleming, Robert L., Jr.; Hart, Walter F., Jr.; Lindall, Edward V., Jr.; Reid, Ronnie D.; and Stewrat, John A., III, 5,159,733, Cl. 26-93.000.

Steyr-Daimler-Puch AG: *See*—
Peier, Othmar, 5,160,008, Cl. 192-85.00C.

Stich, Frederick A.: *See*—
Hubert, Thomas G.; Stich, Frederick A.; Hazen, William J.; and Mills, Ricky, 5,160,832, Cl. 235-145.00R.

Sticklin, Scott J. Sterile cordage dispenser. 5,160,077, Cl. 225-38.000.

Stillman, Neil W., to H_2O Chemists, Inc. Bioremediation yeast and surfactant composition. 5,160,488, Cl. 435-262.500.

Stillman, Neil W.; and Brown, Edward J. Bioremediation enzymatic composition. 5,160,525, Cl. 71-64.100.

Stines, Joseph R., to Vance Products Incorporated. Rotational pressure drive for a medical syringe. 5,160,327, Cl. 604-224.000.

Stirland, Simon J.: *See*—
Fairlie, Robert H.; and Stirland, Simon J., 5,160,937, Cl. 343-781.00P.

Stobby, William G.: *See*—
Shmidt, Creston D.; and Stobby, William G., 5,160,784, Cl. 428-316.600.

Stock, Gerald G.: *See*—
Grutter, Peter J.; Stock, Gerald G.; Cushing, John A.; and Gopp, Alexander Y., 5,159,810, Cl. 60-274.000.

Stokes, James: *See*—
Bania, Paul J.; Adams, Roy E.; and Stokes, James, 5,160,554, Cl. 148-407.000.

Stoldt, Stephen H., to Lubrizol Corporation, The. Fuel compositions. 5,160,350, Cl. 44-347.000.

Stolzman, Michael D. Plastic and fiber container. 5,160,061, Cl. 220-359.000.

Stone, Charles S., to Frequency Electronics, Inc. Multimode crystal oscillator. 5,160,901, Cl. 331-37.000.

Stone & Webster Engineering Corp.: *See*—
Rubin, Jacob N., 5,160,623, Cl. 210-634.000.

Stopa, James L.: *See*—
Lyons, Harold W.; and Stopa, James L., 5,160,874, Cl. 318-268.000.

Storage Technology Corporation: *See*—
Spicer, Barry K., 5,160,078, Cl. 226-190.000.

Story, Ray A.: *See*—
Pennington, James Q.; and Story, Ray A., 5,159,973, Cl. 165-48.100.

Strackenbrock, Dieter; and Lange, Bernd, to Alcatel N.V. Apparatus and method for drawing an optical fiber from a solid blank. 5,160,359, Cl. 65-3.120.

Stradley, Kirk K.: *See*—
Tomek, Martin L.; and Stradley, Kirk K., 5,159,978, Cl. 166-250.000.

Strawder, Glenn G. Bag support for receptacles. 5,160,062, Cl. 220-404.000.

Strietelmeier, Frederick E.: *See*—
Nicholson, James O.; O'Quin, John C., III; O'Quin, John T., II; and Strietelmeier, Frederick E., 5,161,219, Cl. 395-425.000.

Strigl, Reinhard: *See*—
Vocke, Peter; Mahlo, Thomas; and Strigl, Reinhard, 5,160,380, Cl. 148-206.000.

Structural Laminates Company: *See*—
Lambing, Cynthia L. T.; Colpo, James A.; and Herbein, William C., 5,160,771, Cl. 428-57.000.

Stry-Lenkoff Company: *See*—
Landis, Thomas J., 5,160,266, Cl. 434-328.000.

Stumbo, David P.; Wolfe, John C.; and Randall, John N. Alignment technique for masked ion beam lithography. 5,160,845, Cl. 250-491.100.

Sturtevant, Wayne R.: *See*—
Cartmell, James V.; and Sturtevant, Wayne R., 5,160,328, Cl. 604-307.000.

Sudo, Koichi: *See*—
Iwamoto, Tetsushi; Yoshida, Yasunobu; Furuto, Toshiaki; and Sudo, Koichi, 5,160,675, Cl. 264-56.000.

Suemitsu, Satoru: *See*—
Kosaka, Michitaka; Sasaki, Toshiro; Matsumoto, Kuniaki; Akashi, Kichizo; and Suemitsu, Satoru, 5,161,103, Cl. 364-408.000.

Suenaga, Hiroyoshi; Ito, Takeshi; Takagi, Masakuni; Takeuchi, Hiroyoshi; Fukai, Hideaki; and Minakawa, Kuninori, to NKK Corporation. Method for lapping two surfaces of a titanium disk. 5,159,787, Cl. 51-326.000.

Suga, Yuko; and Noguchi, Hiromichi, to Canon Kabushiki Kaisha. Recording liquid and ink-jet recording method making recording unit, ink cartridge, and ink-jet recording apparatus making use thereof. 5,160,370, Cl. 106-20.000.

Suganuma, Hiroshi: *See*—
Takagi, Masahiro; Suganuma, Hiroshi; and Kanamori, Hiroo, 5,160,522, Cl. 65-3.110.

Sugawara, Akihiko; and Takahashi, Yoshihito, to NEC Corporation. Priority encoder for resolving priority contention. 5,160,923, Cl. 340-825.510.

Sugawara, Saburo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Illuminating instrument. 5,160,192, Cl. 362-16.000.

Sugawara, Yukio; Hayashi, Mineo; Konishi, Junji; and Hayashi, Shosaku, to Mitsubishi Materials Corporation; and Onahama Smelting and Refining Company, Ltd. Process for recovering tellurium from copper electrolysis slime. 5,160,588, Cl. 204-109.000.

Sugi, Hikaru: *See*—
Ito, Koichi; Higashihara, Akihito; and Sugi, Hikaru, 5,160,115, Cl. 251-129.120.

Sugie, Masayuki: *See*—
Hayashi, Toshihiro; Takeda, Satoru; Yamazaki, Shyoichiro; Sugie, Masayuki; and Iwaki, Norio, 5,160,754, Cl. 426-94.000.

Sugihara, Osamu, to Hoya Corporation. Microprobe provided circuit substrate and method for producing the same. 5,160,779, Cl. 428-209.000.

Sugimori, Yoshio; Takayama, Susumu; and Kurosaki, Tadao, to Nippon Television Network Corporation. Television broadcasting apparatus including monochromatic characters with a colored contour. 5,161,020, Cl. 358-183.000.

Sugimoto, Yasushi: *See*—
Morishita, Yoshii; Sugimoto, Yasushi; Hayashida, Shigeru; Ishikawa, Hiroko; Noda, Yoshiaki; Murakami, Shigeru; Sato, Munehiro; Saito, Yoshinori; Kurata, Naoji; and Sugita, Yoshio, 5,160,487, Cl. 430-59.000.

Sugita, Yoshio: *See*—
Morishita, Yoshii; Sugimoto, Yasushi; Hayashida, Shigeru; Ishikawa, Hiroko; Noda, Yoshiaki; Murakami, Shigeru; Sato, Munehiro; Saito, Yoshinori; Kurata, Naoji; and Sugita, Yoshio, 5,160,487, Cl. 430-59.000.

Sugiuchi, Masashi; and Kamiyama, Hiroshi, to Nissan Motor Co., Ltd. Variable cam engine. 5,159,905, Cl. 123-90.160.

Sugiura, Kiyohiko; Miki, Nobuaki; Nasu, Takeshi; Sugiura, Masayuki; and Saito, Masao, to Aisin AW Co., Ltd. Electromagnetic valve. 5,160,116, Cl. 251-129.140.

Sugiura, Masayuki: *See*—
Sugiura, Kiyohiko; Miki, Nobuaki; Nasu, Takeshi; Sugiura, Masayuki; and Saito, Masao, 5,160,116, Cl. 251-129.140.

Sugiura, Souichi: *See*—
Higuchi, Takayoshi; and Sugiura, Souichi, 5,160,988, Cl. 257-301.000.

Sugiyama, Yoshiaki: *See*—
Iwashita, Tomonori; Egawa, Akira; and Sugiyama, Yoshiaki, 5,160,952, Cl. 354-76.000.

Sugiyama, Yoshihiro: *See*—
Ishikawa, Hideaki; Sugiyama, Yoshihiro; Muto, Shunichi; and Fujii, Toshio, 5,160,993, Cl. 257-14.000.

Suh, Nam P.: *See*—
Colton, Jonathan S.; and Suh, Nam P., 5,160,674, Cl. 264-50.000.

Sujansky, Vladimir, to ICI Australia Operations Proprietary Limited. Emulsion explosive. 5,160,387, Cl. 149-2.000.

Sullivan, Thomas W.: *See*—
Williams, John C.; Westerson, Kevin W.; Muntean, George L.; and Sullivan, Thomas W., 5,159,911, Cl. 123-467.000.

Sumico Management Planning Company, Ltd.: *See*—
Shibata, Akira, 5,160,366, Cl. 75-232.000.

Sumitomo Electric Industries, Ltd.: *See*—
Higuchi, Harukazu; and Shibano, Yoshizo, 5,161,252, Cl. 455-78.000.
Nakahata, Hideaki; and Fujimori, Naoji, 5,160,869, Cl. 310-313.00A.
Takagi, Masahiro; Suganuma, Hiroshi; and Kanamori, Hiroo, 5,160,522, Cl. 65-3.110.

Sumitomo Light Metal Industries, Ltd.: *See*—
Yoshida, Tsutomu; Inoue, Toshinori; Shirasawa, Toshihiko; and Asahina, Takashi, 5,160,479, Cl. 266-233.000.

Sumitomo Metal Industries, Ltd.: *See*—
Akiyama, Shunichiro; and Fujikawa, Hisao, 5,160,389, Cl. 148-327.000.

Sumitomo Rubber Industries, Ltd.: *See*—
Nishiyama, Tetsuji; and Teraguchi, Takashi, 5,160,839, Cl. 250-222.100.
Ueyoko, Kiyoshi; and Hoshino, Hiroshi, 5,160,384, Cl. 152-454.000.

Summers, Robert B.: *See*—
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,979, Cl. 356-423.000.

Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,980, Cl. 356-423.000.

Sun Microsystems, Inc.: *See*—
Watkins, John; Van Loo, William C.; Michels, Kurt; and Chang, Hugh, 5,161,162, Cl. 371-29.500.

Sunagawa, Masao; and Iwao, Akira, to Hitachi, Ltd. Vacuum cleaner having silencer mechanism. 5,159,738, Cl. 15-326.000.

Sundberg, Sven-Erik: *See*—
Fickling, Peter R.; Sundberg, Sven-Erik; and Ericsson, Mats H., 5,160,541, Cl. 118-405.000.

Sunfish, Ltd. A.S.: *See*—
Lygren, Eivind, 5,160,620, Cl. 210-608.000.

Sung, Jeffrey: *See*—
Owen, William H.; Caywood, John; Drori, Joseph; Jaffe, James; Nojima, Isao; Sung, Jeffrey; and Wang, Ping, 5,161,157, Cl. 371-10.200.

Sunohara, Masaaki: *See*—
Murata, Jun; Sunohara, Masaaki; and Kimoto, Takayuki, 5,160,361, Cl. 65-102.000.

Suomen Vuolukivi Oy: *See*—
Vauhkonen, Reijo, 5,160,212, Cl. 403-294.000.

Suriano, Francis J.: *See*—
Klaass, Reinhard M.; Minshall, Bert J.; Suriano, Francis J.; and Caan, William, 5,160,069, Cl. 60-39.060.

Surma, Terrance: *See*—
Leyden, Roger J.; and Surma, Terrance, 5,160,048, Cl. 211-7.000.

Sutherland, Donald: *See*—
Ford, Ronald K., 5,160,076, Cl. 225-4.000.

Sutherland, Joseph E.: *See*—
Czerwiec, Richard M.; Tyrrell, Raymond E.; Sanders, Gus C.; Sutherland, Joseph E.; Sanders, Richard J., Jr.; Hurlocker, Claude M.; Thorne, Hal A.; Runyon, V. Paul; and Aro, Enn, 5,161,152, Cl. 370-84.000.

Sutton, David L.: *See*—
Snetting, Mark E.; Anderson, Steven A.; Price, Scott D.; and Sutton, David L., 5,159,961, Cl. 141-10.000.

Sutula, Daniel P., Jr. Support handle for a fishing rod. 5,159,775, Cl. 43-21.200.

Suzuki, Akiyoshi: *See*—
Ina, Hideki; Kosugi, Masao; and Suzuki, Akiyoshi, 5,160,957, Cl. 355-43.000.
Miura, Seiya; and Suzuki, Akiyoshi, 5,160,962, Cl. 355-53.000.

Suzuki, Haruyuki, to Ricoh Company, Ltd. Optical disk apparatus with a plurality of heads. 5,161,137, Cl. 369-32.000.

Suzuki, Hideto; Kurose, Yoshikazu; and Aoki, Shinji, to Sony Corporation. Digital data transmitting apparatus. 5,161,171, Cl. 375-108.000.

Suzuki, Hitoshi: *See*—
Kugimiya, Shuzo; Fukumochi, Yoji; Sata, Ichiko; Hirai, Tokyuki; and Suzuki, Hitoshi, 5,161,105, Cl. 364-419.000.

Suzuki, Kunio; and Tomita, Nobuaki, to Yamaha Corporation. Beryllium window incorporated in X-ray radiation system and process of fabrication thereof. 5,161,179, Cl. 378-161.000.

Suzuki, Nobuharu; and Morisawa, Tahei, to Asahi Kogaku Kogyo Kabushiki Kaisha. Viewfinder for camera. 5,160,954, Cl. 354-221.000.

Suzuki, Norio: *See*—
Kitagawa, Hiroshi; Oono, Tetsuya; and Suzuki, Norio, 5,159,831, Cl. 73-118.100.

Suzuki, Satoshi: *See*—
Takahashi, Mineo; Nakayama, Susumu; Suzuki, Satoshi; Mori, Akio; Seo, Hiroyuki; Imamura, Minoru; Tanaka, Hiroshi; and Yoneyama, Norihiro, 5,160,812, Cl. 174-135.000.

Suzuki, Yutaka, to Nissan Motor Co., Ltd. System and method for adaptive lock-up control. 5,160,002, Cl. 192-3.310.

Suzuki, Yutaka, to Nissan Motor Co., Ltd. Lock-up control for smooth start-up. 5,160,003, Cl. 192-3.310.

Svedman, Kjell: *See*—
Johansson, Ingemar; and Svedman, Kjell, 5,160,540, Cl. 106-672.000.

Svensson, Per; and Klippare, Sten, to AB Volvo. Intake air filter for an internal combustion engine. 5,160,519, Cl. 55-482.000.

Swaffield, John D.; and Doyle, John T., to Precision Connector Devices, Inc. High density connector module. 5,160,282, Cl. 439-721.000.

Swanson, Gary J.; and Veldkamp, Wilfrid B., to Massachusetts Institute of Technology. High-efficiency, multilevel, diffractive optical elements. 5,161,059, Cl. 359-565.000.

Sweeney, Albert. Universal joint having three concentric spherical elements interconnected for relative motion by a plurality of balls carried in cooperative indentations defined in adjacent movable surfaces. 5,160,299, Cl. 464-141.000.

Swink, Laurence N.: *See*—
Bruder, John F.; and Swink, Laurence N., 5,161,094, Cl. 361-502.000.

Swinkels, Petrus L. J.: *See*—
Bortolotti, Fabrizio; Pietrantoni, Luciano; Swinkels, Petrus L. J.; and Waas, Marco, 5,160,657, Cl. 252-174.140.

Synaptics, Incorporated: *See*—
Anderson, Janeen D. W.; Mead, Carver A.; Allen, Timothy P.; and Wall, Michael F., 5,160,899, Cl. 330-288.000.

Synergy Microwave Corporation: *See*—
Rohde, Meta; and Joshi, Shankar R., 5,160,810, Cl. 174-52.400.

Systems Development Group: *See*—
Chlop, Bernard W., 5,160,816, Cl. 181-285.000.

T Systems Inc.: *See*—
Oxley, L. Thomas, 5,160,329, Cl. 604-317.000.

Ta Triumph-Adler Aktiengesellschaft: *See*—
Haftmann, Johannes; and Haczek, Werner, 5,160,206, Cl. 400-250.000.

Tadao, Nagai: *See*—
Kenji, Naitou; Yasuhiro, Ohshima; and Tadao, Nagai, 5,160,872, Cl. 315-411.000.

Taga, Noboru: *See*—
Yasuki, Seijiro; Kawai, Kiyoyuki; and Taga, Noboru, 5,161,003, Cl. 358-141.000.

Tagliaferri, Renzo, to Selco S.r.l. Cutting station for a panel cutting machine. 5,159,869, Cl. 83-862.000.

Taguchi, Hiroshi: *See*—
Wada, Minoru; Tanaka, Yoshiaki; Katoh, Hiroshi; and Taguchi, Hiroshi, 5,159,845, Cl. 74-6.000.

Taguchi, Kazushige: *See*—
Mizuma, Kenichi; Furuta, Hideya; Kasahara, Nobuo; Kimura, Noriyuki; Nagatsuna, Shinju; Mamizuka, Mitsuru; Sakai, Yoshihiro; Bannai, Kazunori; Taguchi, Kazushige; Kawaishi, Yasunori; Ohsaki, Makoto; and Hirono, Tatsuo, 5,160,969, Cl. 355-326.000.

Taguchi, Kouichi; and Yamada, Shinichi, to Hitachi, Ltd. Method and system of specification processing. 5,161,211, Cl. 395-10.000.

Taguchi, Tadashi: *See*—
Ishikawa, Masayuki; Taguchi, Tadashi; and Tsuchihashi, Yasuhiko, 5,160,447, Cl. 252-62.540.

Tague, Steven A.: *See*—
Lemay, Richard A.; Tague, Steven A.; Izbicki, Kenneth J.; and Woods, William E., 5,161,217, Cl. 395-375.000.

Tahara, Shinobu: *See*—
Ozaki, Keiichi; Terada, Katsuaki; and Tahara, Shinobu, 5,160,274, Cl. 439-212.000.

Taikisha Ltd.: *See*—
Odawara, Shiro; Ito, Keiichi; and Kobayashi, Kazushi, 5,160,040, Cl. 210-167.000.

Takach, George A., Jr.: *See*—
Leavitt, Dennis D.; and Takach, George A., Jr., 5,160,847, Cl. 250-505.100.

Takada, Kunio; Otani, Kenji; and Manabe, Akira, to Hitachi, Ltd. Drainage distribution amount determining method and drainage system. 5,160,216, Cl. 405-92.000.

Takagi, Fumio, to CKD Corporation. Pipe coupler with split ring chuck. 5,160,179, Cl. 285-340.000.

Takagi, Masahiro; Suganuma, Hiroshi; and Kanamori, Hiroo, to Sumitomo Electric Industries, Ltd. Method for producing preform for polarization retaining optical fiber. 5,160,522, Cl. 65-3.110.

Takagi, Masahiro: *See*—
Takemori, Toshio; Tsurumi, Toshinobu; and Takagi, Masahiro, 5,160,760, Cl. 426-660.000.

Takagi, Masakuni: *See*—
Suenaga, Hiroyoshi; Ito, Takeshi; Takagi, Masakuni; Takeuchi, Hiroyoshi; Fukai, Hideaki; and Minakawa, Kuninori, 5,159,787, Cl. 51-326.000.

Takagi, Tadashi: *See*—
Mochizuki, Mitsuru; Takagi, Tadashi; and Urasaki, Shuji, 5,160,984, Cl. 257-277.000.

Takagi, Toshiaki; and Deguchi, Hiromi, to Terumo Kabushiki Kaisha. Hollow fiber type liquid processing apparatus. 5,160,615, Cl. 210-321.800.

Takagi, Yuji: *See*—
Fukushima, Yoshihisa; Satoh, Isao; Takagi, Yuji; Azumatani, Yasushi; and Hamasaka, Hiroshi, 5,161,143, Cl. 369-53.000.

Takagi, Yukihito; Imamaki, Teruo; Nakata, Shigeru; and Sakuma, Mikio, to Brother Kogyo Kabushiki Kaisha. Tape cutter device. 5,160,573, Cl. 156-510.000.

Takahashi, Hideki; Tani, Shigemitsu; Fukano, Akira; Katakura, Kazuto; Makimoto, Hitoshi; and Watanabe, Yoshikazu, to Matsushita Electric Industrial Co., Ltd. Image recording apparatus occupying a minimum amount of space. 5,160,964, Cl. 355-200.000.

Takahashi, Hirokazu: *See*—
Muramoto, Tomotaka; Takahashi, Hirokazu; Horii, Hiroyuki; and Hori, Masashi, 5,161,070, Cl. 360-8.000.

Takahashi, Koichi: *See*—
Ichikawa, Haruo; Iida, Sanpei; and Takahashi, Koichi, 5,159,747, Cl. 29-512.000.

Takahashi, Masanori, to Sanshin Kogyo Kabushiki Kaisha. Air intake system for two cycle multi cylinder engine. 5,159,903, Cl. 123-65.00A.

Takahashi, Mineo; Nakayama, Susumu; Suzuki, Satoshi; Mori, Akio; Seo, Hiroyuki; Imamura, Minoru; Tanaka, Hiroshi; and Yoneyama, Norihiro, to Yazaki Corporation. Flat wire harness attaching unit. 5,160,812, Cl. 174-135.000.

Takahashi, Ryoji, to Chisso Corporation. Cellulose-based, inflammable, bulky processed sheets and method for making such sheets. 5,160,582, Cl. 162-117.000.

Takahashi, Yoshihito: *See*—
Sugawara, Akihiko; and Takahashi, Yoshihito, 5,160,923, Cl. 340-825.510.

Takaichi, Akihisa; Okamoto, Toshihiko; and Matsumoto, Toshiaki, to Otsuka Pharmaceutical Co., Ltd. Preparation for iron supply, preparation for vitamin supply and method for stabilizing a foam preparation. 5,160,728, Cl. 424-44.000.

Takamori, Tsutomu: *See*—
Kobayashi, Yuji; and Takamori, Tsutomu, 5,161,032, Cl. 358-326.000.

Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Koyama, Yoshihisa; and Uchiyama, Yuji, to Victor Com-

pany of Japan, Ltd. Recording head with carrier generation and transport layers adjacent a photo-modulation layer for recording information included in an electro-magnetic radiation-beam applied thereto. 5,161,007, Cl. 358-43.000.

Takanashi, Kenichi: *See*—
Tomita, Kan; Ohsawa, Takayuki; Takanashi, Kenichi; and Endo, Osamu, 5,161,047, Cl. 359-216.000.

Takano, Fumitomo: *See*—
Tsujii, Gen; Kobayashi, Nobuo; and Takano, Fumitomo, 5,160,820, Cl. 219-116.000.

Takano, Yoshihiko: *See*—
Senda, Atsuo; Nakagawa, Takuji; and Takano, Yoshihiko, 5,160,373, Cl. 106-1.290.

Takao, Mitsunori: *See*—
Abe, Tomoaki; Maeda, Katsuya; Hara, Mitsuo; Kamio, Shigeru; and Takao, Mitsunori, 5,159,990, Cl. 180-197.000.

Takata, Allan. Surface suit with removable water and wind resistant inserts. 5,159,716, Cl. 2-2.10R.

Takata Corporation: *See*—
Nishizawa, Muneo; and Yano, Hideaki, 5,160,168, Cl. 280-806.000.

Takatani, Yoshiaki: *See*—
Kodama, Kenzaburo; Kamei, Kenji; Yoshida, Kousuke; Ishikawa, Katsuya; Kubo, Yukio; and Takatani, Yoshiaki, 5,160,708, Cl. 422-171.000.

Takaya, Seiki: *See*—
Mihira, Hiroshi; Shimizu, Tetsuo; Hirahara, Kazuhiro; Ishihara, Toshinobu; and Takaya, Seiki, 5,160,542, Cl. 118-715.000.

Takayama, Suguru: *See*—
Namba, Kenryo; Shinkai, Masahiro; Tezuka, Sinichi; Inoue, Tetsushi; Aoi, Toshiki; and Takayama, Suguru, 5,161,150, Cl. 369-275.400.

Takayama, Susumu: *See*—
Sugimori, Yoshio; Takayama, Susumu; and Kurosaki, Tadao, 5,161,020, Cl. 358-183.000.

Takebayashi, Etsushi: *See*—
Yamaguchi, Atsuo; and Takebayashi, Etsushi, 5,160,856, Cl. 307-296.800.

Takeda, Satoru: *See*—
Hayashi, Toshihiro; Takeda, Satoru; Yamazaki, Shyoichiro; Sugie, Masayuki; and Iwaki, Norio, 5,160,754, Cl. 426-94.000.

Takemori, Toshio; Tsurumi, Toshinobu; and Takagi, Masahiro, to Lotte Company Limited. Heat-resistant chocolate and a method for producing it. 5,160,760, Cl. 426-660.000.

Takemura, Isao: *See*—
Nagasaki, Yoshimi; Hashimoto, Takao; Takemura, Isao; Imai, Hiroshi; Hirama, Yasunobu; and Nakajima, Tadayoshi, 5,160,621, Cl. 210-614.000.

Takeoka, Shinji: *See*—
Hasegawa, Etsuo; Takeoka, Shinji; Ohno, Hiroyuki; Nishide, Hiroyuki; and Tsuchida, Eishun, 5,160,740, Cl. 424-450.000.

Takeshima, Akira: *See*—
Yoshiji, Takeo; Sato, Yutaka; Takeshima, Akira; and Yoshioka, Teruo, 5,160,011, Cl. 198-345.300.

Takeuchi, Hiroyoshi: *See*—
Suenaga, Hiroyoshi; Ito, Takeshi; Takagi, Masakuni; Takeuchi, Hiroyoshi; Fukai, Hideaki; and Minakawa, Kuninori, 5,159,787, Cl. 51-326.000.

Takeuchi, Kiyoshi: *See*—
Okaniwa, Takashi; Takeuchi, Kiyoshi; Kato, Toshiharu; and Nagasawa, Keizo, 5,160,645, Cl. 252-32.70E.

Takeuchi, Koichiro: *See*—
Yoshimura, Hiroshi; Kitada, Masahito; Takeuchi, Koichiro; and Doi, Junichi, 5,159,856, Cl. 74-867.000.

Takeuchi, Ryoji; Yoshimaru, Tomohisa; and Doi, Akihiko, to Kabushiki Kaisha Toshiba. System for recording information on an optical recording medium. 5,161,144, Cl. 369-54.000.

Takeuchi, Tadao: *See*—
Taniguchi, Naohiro; Koike, Syuzo; Watanabe, Yasuhiko; Takeuchi, Tadao; and Fujiwara, Noboru, 5,160,041, Cl. 210-205.000.

Takida, Hiroshi: *See*—
Asano, Kuniyoshi; Uemura, Tomoyoshi; and Takida, Hiroshi, 5,160,475, Cl. 264-331.170.

Takuma, Masaaki: *See*—
Kawata, Norio; and Takuma, Masaaki, 5,161,028, Cl. 358-254.000.

Talley, Robert E.: *See*—
Adams, John M.; Chance, Christopher N.; DeBlasio, James A.; Evers, Donald H.; Harris, William C., Jr.; Kirby, Michael A., Sr.; Newsome, Reginald W.; Pham, Xuan M.; and Talley, Robert E., 5,160,023, Cl. 206-256.000.

Talonn, Daniel A.; and Ranford, Alan B., to Sherwood Medical Company. Combined syringe and needle shield. 5,160,326, Cl. 604-198.000.

Talu, Orhan, to Cleveland State University. Gas separation process. 5,160,512, Cl. 55-28.000.

Tamagaki, Akira: *See*—
Ibuchi, Yoshiaki; and Tamagaki, Akira, 5,160,960, Cl. 355-27.000.

Tamarack Telecom Inc.: *See*—
Jowang, Fu, 5,161,069, Cl. 359-889.000.

Tammi, Pekka; and Marjoniemi, Kari, to Hollming Oy. Press cynlinder shell structure for paper machine press section. 5,160,410, Cl. 162-358.100.

Tan, Chung-Sung, to National Tsing Hua University. Process for separating ethanol from aqueous solution. 5,160,044, Cl. 210-634.000.

Tanaka, Hiroaki: *See*—
Nakamura, Eiichi; Tanaka, Hiroaki; Tanaka, Yoshiharu; Iitake, Takashi; and Hoshikawa, Hiroshi, 5,160,604, Cl. 210-85.000.

Tanaka, Hiroshi: *See*—
Takahashi, Mineo; Nakayama, Susumu; Suzuki, Satoshi; Mori, Akio; Seo, Hiroyuki; Imamura, Minoru; Tanaka, Hiroshi; and Yoneyama, Norihiro, 5,160,812, Cl. 174-135.000.

Tanaka, Hitoshi; and Kikuchi, Katsumori, to Asahi Kogaku Kogyo Kabushiki Kaisha. Engaging mechanism of roller and guide groove in optical element. 5,161,066, Cl. 359-823.000.

Tanaka, Koichi: *See*—
Yaguchi, Toshiyuki; and Tanaka, Koichi, 5,161,160, Cl. 371-22.300.

Tanaka, Masami: *See*—
Kajita, Harumasa; Yanagimichi, Toyokazu; Kariya, Tetsuo; Wakabayashi, Toshikazu; Kawashima, Ichiro; Nakanami, Satoshi; and Tanaka, Masami, 5,161,187, Cl. 380-15.000.

Tanaka, Nobuhiro: *See*—
Sato, Hiroyuki; Tanaka, Nobuhiro; and Ohshima, Kenji, 5,161,130, Cl. 368-228.000.

Tanaka, Shigeo: *See*—
Kimura, Junko; and Tanaka, Shigeo, 5,161,031, Cl. 358-310.000.

Tanaka, Yoshiaki: *See*—
Wada, Minoru; Tanaka, Yoshiaki; Katoh, Hiroshi; and Taguchi, Hiroshi, 5,159,845, Cl. 74-6.000.

Tanaka, Yoshiharu: *See*—
Nakamura, Eiichi; Tanaka, Hiroaki; Tanaka, Yoshiharu; Iitake, Takashi; and Hoshikawa, Hiroshi, 5,160,604, Cl. 210-85.000.

Tandem Scanning Corporation: *See*—
Hill, James D., 5,161,052, Cl. 359-377.000.

Tani, Shigemitsu: *See*—
Takahashi, Hideki; Tani, Shigemitsu; Fukano, Akira; Katakura, Kazuto; Makimoto, Hitoshi; and Watanabe, Yoshikazu, 5,160,964, Cl. 355-200.000.

Taniguchi, Naohiro; Koike, Syuzo; Watanabe, Yasuhiko; Takeuchi, Tadao; and Fujiwara, Noboru, to Japan Sewage Works Agency; and Kurita Water Industries Ltd. Coagulation reaction tank. 5,160,041, Cl. 210-205.000.

Tanioka, Hiroshi: *See*—
Ihara, Yuji; and Tanioka, Hiroshi, 5,161,061, Cl. 359-708.000.

Tannenbaum, Harvey P., to Du Pont de Nemours, E. I., and Company. Non-stick coating system with two perfluorocarbon resins in topcoat for concentration gradient. 5,160,791, Cl. 428-422.000.

Tanno, Kiyohiko: *See*—
Hirane, Hideo; Tanno, Kiyohiko; and Masuda, Kazuhito, 5,160,837, Cl. 250-208.200.

Tanno, Masayuki; Watanabe, Toshiaki; and Ryuo, Toshihiko, to Shin-Etsu Chemical Co., Ltd. Optical isolator and method for preparing same. 5,161,049, Cl. 359-281.000.

Tanoi, Minoru; and Kizaki, Masayasu, to Casio Computer Co., Ltd. IC module having a folding junction structure. 5,161,009, Cl. 359-82.000.

Tas, Adrianus W. Apparatus for filling container with products such as fruits. 5,159,796, Cl. 53-245.000.

Taschenbrecker, Erich: *See*—
Lindner, Wolfgang; Neuber, Hans-Ulrich; and Taschenbrecker, Erich, 5,160,666, Cl. 252-402.000.

Tatsu, Tetsuo: *See*—
Yoshimoto, Masafumi; Nakatsuji, Tadao; Nagano, Kazuhiko; and Tatsu, Tetsuo, 5,160,586, Cl. 204-59.00R.

Tavernier, Herve: *See*—
Larreco, Michel M.; Spiquel, Jacques M.; and Tavernier, Herve, 5,159,969, Cl. 164-415.000.

Taylor, Gerald E.: *See*—
Owen, S. Hudson; Baldwin, Roger A.; Taylor, Gerald E.; and Wolff, Paul A., 5,160,084, Cl. 238-310.000.

Taylor, Junius E.: *See*—
Jensen, Joseph C.; and Taylor, Junius E., 5,160,396, Cl. 156-304.200.

TDK Corporation: *See*—
Koga, Keiji; Satoh, Jun-ichi; Yokoyama, Kenji; Nisizawa, Akinori; and Tokuoka, Yasumichi, 5,160,761, Cl. 427-548.000.
Namba, Kenryo; Shinkai, Masahiro; Tezuka, Sinichi; Inoue, Tetsushi; Aoi, Toshiki; and Takayama, Suguru, 5,161,150, Cl. 369-275.400.

Tech-Air, Inc.: *See*—
Noland, Richard D., 5,160,222, Cl. 406-124.000.

Technology Finance Corporation (Prop.) Ltd: *See*—
Thackery, Michael M.; and Gummow, Rosalind J., 5,160,712, Cl. 423-138.000.

Tecumseh Products Company: *See*—
Kandpal, Tara C., 5,160,247, Cl. 417-415.000.

Tegel, Robert G.: *See*—
Adamski, Maximilian, Jr.; Ruderman, Stephen; and Tegel, Robert G., 5,159,874, Cl. 112-262.300.

Telediffusion de France: *See*—
Pele, Daniele; and Choquet, Bruno, 5,161,001, Cl. 358-138.000.

Teledyne Industries, Inc.: *See*—
Ash, Kenneth C.; Crocker, William A.; Haygarth, John C.; Lee, David R.; Morris, Donald; Peterson, John R.; Riesen, Jon A.; and Yih, Robert S., 5,160,482, Cl. 423-75.000.

Teledyne Kinetics: *See*—
Hakamian, Mohammad, 5,160,268, Cl. 439-66.000.

Telefonaktiebolaget L M Ericsson: *See*—
Djupsjobacka, Anders G., 5,161,206, Cl. 385-2.000.
Fickling, Peter R.; Sundberg, Sven-Erik; and Ericsson, Mats H., 5,160,541, Cl. 118-405.000.

Telemecanique: *See*—
Jean-Pierre, Conil; and Pierrot, Henri, 5,160,924, Cl. 340-825.520.

Temming, Leonardus J., to Staalkat B.V. Carrier for articles such as eggs and conveying apparatus comprising such a carrier. 5,160,019, Cl. 198-803.900.
Ten Eyck, Timothy A., to Texas Instruments Incorporated. Voltage generator having steep temperature coefficient and method of operation. 5,160,882, Cl. 323-314.000.
Terada, Akio, to Sony Corporation. Track jump control apparatus. 5,161,140, Cl. 369-44.280.
Terada, Katsuaki: *See—*
Ozaki, Keiichi; Terada, Katsuaki; and Tahara, Shinobu, 5,160,274, Cl. 439-212.000.
Terada, Takao: *See—*
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,979, Cl. 356-423.000.
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,980, Cl. 356-423.000.
Teraguchi, Takashi: *See—*
Nishiyama, Tetsuji; and Teraguchi, Takashi, 5,160,839, Cl. 250-222.100.
Terasaki, Minako: *See—*
Ono, Takashi; Yagyu, Tatsuya; Fukuda, Katsumi; and Terasaki, Minako, 5,160,504, Cl. 8-436.000.
Terrat, Jean-Paul; and Fort, Pascal, to Centre Stephanois de Recherches Mecaniques Hydromecanique et Frottement. Chromium-nitrogen alloy surface coating composition. 5,160,537, Cl. 106-36.000.
Terry, Fred L., Jr.: *See—*
Carson, Paul L.; Fitting, Dale W.; Robinson, Andrew L.; and Terry, Fred L., Jr., 5,160,870, Cl. 310-339.000.
Terumo Kabushiki Kaisha: *See—*
Nomura, Osamu, 5,160,332, Cl. 604-405.000.
Sasaki, Masatomi; Kashiwagi, Nobuyoshi; Sakakibara, Hiroki; and Saruhashi, Makoto, 5,160,672, Cl. 264-41.000.
Takagi, Toshiaki; and Deguchi, Hiromi, 5,160,615, Cl. 210-321.800.
Tervonen, Ari: *See—*
Honkanen, Seppo; and Tervonen, Ari, 5,160,523, Cl. 65-30.130.
Teshima, Fumiaki; Inoue, Katsuhiro; Kurebayashi, Kaoru; Mihara, Yukihiro; and Kishimoto, Takuya, to Kabushiki Kaisha Toshiba. System test apparatus for verifying operability. 5,161,115, Cl. 364-551.010.
Tessier, Jean-Paul: *See—*
Aubry, Jean; Teton, Andre; and Tessier, Jean-Paul, 5,160,516, Cl. 55-269.000.
Teton, Andre: *See—*
Aubry, Jean; Teton, Andre; and Tessier, Jean-Paul, 5,160,516, Cl. 55-269.000.
Tetrault, Jacques: *See—*
Spirig, Walter J.; and Tetrault, Jacques, 5,160,850, Cl. 250-561.000.
Texaco Chemical Company: *See—*
Marquis, Edward T.; Speranza, George P.; Sheu, Yu-Hwa E.; Culbreth, William K., III; and Pottratz, David G., 5,160,587, Cl. 203-64.000.
Texaco Inc.: *See—*
Najjar, Mitri S.; and Hilmar, Martin D., 5,160,352, Cl. 55-16.000.
Nalesnik, Theodore E.; and Kapuscinski, Maria M., 5,160,446, Cl. 252-51.50A.
Pasternak, Mordechai, 5,160,046, Cl. 210-640.000.
Texas Instruments Incorporated: *See—*
Garcia, Felix, Jr., 5,161,054, Cl. 359-462.000.
Hochschild, James R., 5,161,185, Cl. 379-416.000.
Houston, Theodore W., 5,160,989, Cl. 257-347.000.
Lamson, Michael A., 5,160,893, Cl. 324-654.000.
Littleton, James G., 5,161,212, Cl. 395-118.000.
Love, Andrew M., 5,161,124, Cl. 361-222.000.
Mahant-Shetti, Shivaling S.; Aton, Thomas J.; and Gale, Rebecca J., 5,159,752, Cl. 29-846.000.
Maytum, Michael, 5,161,183, Cl. 379-412.000.
Mori, Kiyoshi, 5,160,491, Cl. 437-40.000.
Robertson, Iain C., 5,161,122, Cl. 365-195.000.
Ten Eyck, Timothy A., 5,160,882, Cl. 323-314.000.
Tezuka, Sinichi: *See—*
Namba, Kenryo; Shinkai, Masahiro; Tezuka, Sinichi; Inoue, Tetsushi; Aoi, Toshiki; and Takayama, Suguru, 5,161,150, Cl. 369-275.400.
Thackery, Michael M.; and Gummow, Rosalind J., to Technology Finance Corporation (Prop.) Ltd. Lithium transition metal oxide. 5,160,712, Cl. 423-138.000.
Thakrar, Ashok R.: *See—*
Evans, John M.; and Thakrar, Ashok R., 5,160,463, Cl. 264-17.000.
Thaler, Arnold; Saud, Ivan; and Yip, P. C., to Windmere Corporation. Multi-mode control circuit and indicator arrangement for an electrical appliance. 5,160,831, Cl. 219-506.000.
Thaler, Martin D.; Giese, Robert W.; Puletti, Paul; and Schmidt, Robert, to National Starch and Chemical Investment Holding Corporation. Method of producing a non-tacky hot melt adhesive containing package. 5,160,686, Cl. 264-255.000.
Thalmann, Walter: *See—*
Friedrich, Christian; Reheis, Nikolaus; and Thalmann, Walter, 5,160,090, Cl. 228-121.000.
Thayer, Jeffrey S.: *See—*
Frederickson, Arthur R.; Nanevicz, Joseph E.; Thayer, Jeffrey S.; and Parkinson, Dean B., 5,160,374, Cl. 106-401.000.
Theeuwes, Felix: *See—*
Edgren, David E.; and Theeuwes, Felix, 5,160,743, Cl. 424-473.000.
Yum, Su I.; and Theeuwes, Felix, 5,160,320, Cl. 604-85.000.
Therm-O-Disc, Incorporated: *See—*
Hohider, David; and Cenky, Mark A., 5,161,091, Cl. 361-386.000.
Thiemer, Helmut; Schottner, Walter; and Voss, Peter, to Eheim GmbH & Co. KG. Filter for aquarium. 5,160,607, Cl. 210-128.000.
Thom, Guenter: *See—*
Zell, Karl; and Thom, Guenter, 5,160,272, Cl. 439-101.000.
Thomas, Charles E., to United Container Machinery Group, Inc. Corrugating apparatus having a liquid filled seal roll. 5,160,400, Cl. 156-382.000.
Thomas, Hermann; and Herd, Josef, to Maschinenfabrik Goebel GmbH. Knife cylinder for processing weblike material. 5,159,868, Cl. 83-674.000.
Thomas, James A., Sr., to Lindberg Corporation. Drive system for endless belt conveyors with rollers having driving, supporting and aligning features. 5,160,020, Cl. 198-834.000.
Thomas, John S., Jr., to James River II, Inc. Method for the formation of a clamped wave seal structure. 5,160,391, Cl. 156-69.000.
Thomasson, James S.: *See—*
Brinkley, Paul A.; Brown, Thomas W.; Flinchum, Jack G., Jr.; Perfetti, Thomas A.; Thomasson, James S.; and Young, Harvey J., 5,159,942, Cl. 131-298.000.
Thompson, Joel L.: *See—*
Murray, Charles M.; Thompson, Joel L.; and Hentz, Lawrence H., Jr., 5,160,707, Cl. 422-170.000.
Thompson, William. Telescoping pipes and application for such telescoping pipes in fire sprinkler systems. 5,160,174, Cl. 285-32.000.
Thomson-Brandt Armements: *See—*
Fulchiron, Noel; Naillon, Bernard; and N. daud, Patrick, 5,160,803, Cl. 102-363.000.
Thomson Consumer Electronics, Inc.: *See—*
Keenan, Douglas M., 5,161,023, Cl. 358-193.100.
Rodriguez-Cavazos, Enrique; Gleim, Gunter; and Chauvin, Jacques, 5,161,002, Cl. 358-140.000.
Thomson-CSF: *See—*
Delacourt, Dominique; Papuchon, Michel; and Pocholle, Jean-Paul, 5,160,991, Cl. 250-338.400.
Thomson, William H.: *See—*
Gartland, Robert J.; and Thomson, William H., 5,160,383, Cl. 152-510.000.
Thongs, Lawrence C., Jr., to United States of America, Army. Method for joining tubular filament wound composites to other bodies. 5,160,392, Cl. 156-172.000.
Thonnessen, Dieter: *See—*
Hartel, Gunter; Schurfeld, Armin; Losing, Karl-Henrich; Thonnesen, Dieter; and Remde, Ulrich, 5,159,898, Cl. 123-1.00A.
Thorne, Hal A.: *See—*
Czerwiec, Richard M.; Tyrrell, Raymond E.; Sanders, Gus C.; Sutherland, Joseph E.; Sanders, Richard J., Jr.; Hurlocker, Claude M.; Thorne, Hal A.; Runyon, V. Paul; and Aro, Enn, 5,161,152, Cl. 370-84.000.
Thorp, Phil D.; and Sims, Stephen F., to Aro Corporation, The. Valve construction for automatic shut-off screwdrivers and the like. 5,159,987, Cl. 173-176.000.
Tietema, Roel: *See—*
Hauzer, Fransiscus J. M.; Munz, Wolf-Dieter; Buil, Boudewijn J. A. M.; Schulze, Dietmar; and Tietema, Roel, 5,160,595, Cl. 204-192.380.
TigerMark: *See—*
Miller, Eric A., 5,160,195, Cl. 362-300.000.
Tihanyi, Jenoe: *See—*
Leipold, Ludwig; Rothleitner, Hubert; Sander, Rainald; and Tihanyi, Jenoe, 5,160,862, Cl. 307-571.000.
Till, Carolyn A.: *See—*
Addink, Marvin; Hu, Cheney Y.; Leyba, Todd; Mullen, John J.; Till, Carolyn A.; and Holmes, Andrew W., 5,161,214, Cl. 395-145.000.
Tiny-ettes Infant Shoes, Inc.: *See—*
Longo, Anthony J., Jr., 5,159,768, Cl. 36-139.000.
Tischhauser, Thomas J.: *See—*
Cottingham, David J.; Petrites, Michael J.; and Tischhauser, Thomas J., 5,159,751, Cl. 29-832.000.
Titanium Metals Corporation: *See—*
Bania, Paul J.; Adams, Roy E.; and Stokes, James, 5,160,554, Cl. 148-407.000.
Titmas and Associates Incorporated: *See—*
Titmas, James A., 5,160,381, Cl. 162-61.000.
Titmas, James A., to Titmas and Associates Incorporated; and Waste Safety International, Inc. Method for oxygen bleaching paper pulp. 5,160,581, Cl. 162-61.000.
Todokoro, Hideo; Shinada, Hiroyuki; and Fukuhara, Satoru, to Hitachi, Ltd. Charged particle beam device. 5,160,884, Cl. 324-158.00R.
Tofferl, Andreas: *See—*
Brustle, Klaus; Tofferl, Andreas; and Rock, Erich, 5,159,740, Cl. 16-258.000.
Togashi, Mitsuo: *See—*
Tonariya, Yoshito; Wada, Yukihito; Yamaguchi, Kazuhiro; Yamazaki, Tomio; Sakai, Isamu; Yokoi, Shigeru; Togashi, Mitsuo; and Noguchi, Yukihiro, 5,160,724, Cl. 424-4.000.
Tohgun Kigyo Co., Ltd.: *See—*
Kaburaki, Masahiko, 5,159,923, Cl. 128-201.270.
Tojo, Tetsuro: *See—*
Kondo, Teruhisa; Tojo, Tetsuro; and Watanabe, Nobuatsu, 5,160,415, Cl. 204-60.000.
Tokico Ltd.: *See—*
Okada, Hiroki; Mitsuhashi, Hiroshi; and Sakamoto, Susumu, 5,160,253, Cl. 418-55.200.

Utsumi, Noriyuki, 5,160,977, Cl. 356-376.000.
Tokita, Hidetoshi: *See*—
Harada, Takashi; Fujimura, Susumu; Higashiyama, Masahide; and Tokita, Hidetoshi, 5,160,038, Cl. 210-149.000.
Tokuoka, Yasumichi: *See*—
Koga, Keiji; Satoh, Jun-ichi; Yokoyama, Kenji; Nisizawa, Akinori; and Tokuoka, Yasumichi, 5,160,761, Cl. 427-548.000.
Tokusa, Kenji: *See*—
Hojo, Toshiyuki; Tokusa, Kenji; Oguni, Kensaku; and Nakayama, Susumu, 5,159,817, Cl. 62-81.000.
Tomek, Martin L.; and Stradley, Kirk K., to Halliburton Logging Services, Inc. Connecting apparatus for logging tools including electrical feedthrough and isolation system with bridle assembly. 5,159,978, Cl. 166-250.000.
Tomii, Kaoru; and Kaneko, Akira, to Matsushita Electric Industrial Co., Ltd. Flat configuration image display apparatus and manufacturing method thereof. 5,160,871, Cl. 315-366.000.
Tominaga, Chikara: *See*—
Tomita, Masatoshi; Yamamoto, Susumu; and Tominaga, Chikara, 5,160,552, Cl. 148-277.000.
Tomita, Kan; Ohsawa, Takayuki; Takanashi, Kenichi; and Endo, Osamu, to Ricoh Company, Ltd. Optical scanner for image recording apparatus. 5,161,047, Cl. 359-216.000.
Tomita, Masatoshi; Yamamoto, Susumu; and Tominaga, Chikara, to Nippon Mining Co., Ltd. Colored zinc coating. 5,160,552, Cl. 148-277.000.
Tomita, Nobuaki: *See*—
Suzuki, Kunio; and Tomita, Nobuaki, 5,161,179, Cl. 378-161.000.
Tomiyama, Takamichi; Nara, Hitoshi; and Adachi, Osamu, to Sony Corporation. Objective lens driving apparatus for an optical recording and/or reproducing apparatus. 5,161,067, Cl. 359-824.000.
Tomiyama, Takeshi: *See*—
Hashimoto, Sadaaki; and Tomiyama, Takeshi, 5,160,778, Cl. 428-195.000.
Tomizuka, Kazuo: *See*—
Sandoh, Fumio; and Tomizuka, Kazuo, 5,160,997, Cl. 257-207.000.
Tomoda, Susumu: *See*—
Hakkaku, Kunio; Tomoda, Susumu; Morita, Satosi; Masuda, Akira; and Odagiri, Sinji, 5,161,038, Cl. 358-496.000.
Tonariya, Yoshito; Wada, Yukihito; Yamaguchi, Kazuhiro; Yamazaki, Tomio; Sakai, Isamu; Yokoi, Shigeru; Togashi, Mitsuo; and Noguchi, Yukihiro, to Ohta Seiyaku Kabushiki Kaisha. Barium sulfate contrast medium for X-ray examination of the large intestine. 5,160,724, Cl. 424-4.000.
Tonegawa, Tadashi, to Sharp Kabushiki Kaisha. Image forming apparatus with layer thinning detection. 5,160,967, Cl. 355-208.000.
Tong, Lee: *See*—
Simon, Tim; and Tong, Lee, 5,160,853, Cl. 307-140.000.
Toppel, Karl O., to BOC Group, Inc., The. Adsorbent vessel having a convective heat exchanger and flow developer. 5,160,355, Cl. 55-269.000.
Toraguchi, Makoto; Katagiri, Genichi; and Sakakibara, Yasushi, to Fuji Electric Co., Ltd. Electrostatic chuck. 5,160,152, Cl. 279-128.000.
Torkington, Richard S.; and Lamoreaux, David G., to Motorola, Inc. High isolation packaging technology. 5,160,903, Cl. 333-12.000.
Tornatore, Joseph. Ashtray apparatus. 5,159,941, Cl. 131-236.000.
Torrence, Arthur L., to Mechtronics Corporation. Roller shelf and method of making same. 5,159,753, Cl. 29-895.220.
Tortola, Angelo; and Mifflitt, Donald C., to Curtis Manufacturing Company, Inc. Safe, rechargeable, battery-containing power pack and method. 5,160,879, Cl. 320-2.000.
Tosoh Corporation: *See*—
Iwamoto, Tetsushi; Yoshida, Yasunobu; Furuto, Toshiaki; and Sudo, Koichi, 5,160,675, Cl. 264-56.000.
Totsuka, Nobuo; Kimura, Mitsuo; Kurisu, Takao; Mishiro, Yuji; Sengan, Masakazu; Ishizawa, Katsunobu; Kashihara, Shigemitsu; Kanazawa, Minoru; and Komatu, Nagahiro, to Kawasaki Steel Corp.; and San-ai Oil Co. Ltd. Electrolytic processing method for electrolytically processing metal surface. 5,160,590, Cl. 204-141.500.
Towa Chemical Industry Co., Ltd.: *See*—
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, 5,160,546, Cl. 127-60.000.
Townsend Engineering Company: *See*—
DuBois, Gerald N., III, 5,160,289, Cl. 452-127.000.
Toyo Tanso Co., Ltd.: *See*—
Kondo, Teruhisa; Tojo, Tetsuro; and Watanabe, Nobuatsu, 5,160,415, Cl. 204-60.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Ninomiya, Masakazu; Omori, Norio; and Nakagawa, Satoshi, 5,159,910, Cl. 123-196.0AB.
Tozuka, Akira; Kurakake, Yasushi; and Mizuno, Kotaro, to Yamaha Corporation. Electronic musical instrument. 5,160,799, Cl. 84-653.000.
Tramezzani, Giancarlo, to Alian International Aktiengesellschaft. Self-locking nut. 5,160,227, Cl. 411-278.000.
Tran, Danh C. Method for making optical fiber preforms. 5,160,521, Cl. 65-3.110.
Trapp, Robert L.: *See*—
Gilbert, Paul H.; Niemann, Ronald G.; and Trapp, Robert L., 5,161,170, Cl. 375-98.000.
Travor, Bruce W.; Marshall, Frank P.; and Kraynak, Timothy L., to United States of America, Navy. Obturator retaining means. 5,160,800, Cl. 89-1.570.
Tremco Incorporated: *See*—
Cohen, Joel A.; and Virnelson, R. Craig, 5,160,826, Cl. 250-339.000.
Tremulis, William S., to Advanced Cardiovascular Systems, Inc. Steerable dilatation catheter. 5,159,937, Cl. 128-772.000.
Tribophysics Corporation: *See*—
Scheld, John L., 5,160,646, Cl. 252-32.500.
Trident, Inc.: *See*—
Cooke, Theodore M.; and Reed, Wilfred F., 5,160,535, Cl. 106-19.00R.
Triline AB: *See*—
Karlsson, Lars, 5,160,258, Cl. 432-152.000.
Trube, Hans: *See*—
Koukal, Heinz; Dusterhoft, Richard; and Trube, Hans, 5,160,293, Cl. 454-69.000.
Truzschler GmbH & Co. KG: *See*—
Leifeld, Ferdinand, 5,159,840, Cl. 73-861.730.
TRW Inc.: *See*—
Carter, Jeffery A.; Otsubo, Peggy M.; Gravenstede, Kenneth N.; and Grotz, Robert A., 5,161,230, Cl. 395-800.000.
TRW Vehicle Safety Systems Inc.: *See*—
Fischer, Kurt F.; and Awotwi, Samuel A., 5,160,164, Cl. 280-743.000.
Tsai, Ching-Yun. Wireless video/audio signal or data transmission device and its remote control circuit. 5,161,021, Cl. 358-188.000.
Tsai, Wilman: *See*—
Garg, Diwakar; Tsai, Wilman; Iampietro, Robert L.; Kimock, Fred M.; and Kelly, C. Michael, 5,160,544, Cl. 118-724.000.
Tsengas, Steven. Fishing equipment anchor. 5,160,257, Cl. 43-25.000.
Tsuchida, Eishun: *See*—
Hasegawa, Etsuo; Takeoka, Shinji; Ohno, Hiroyuki; Nishide, Hiroyuki; and Tsuchida, Eishun, 5,160,740, Cl. 424-450.000.
Tsuchihashi, Yasuhiko: *See*—
Ishikawa, Masayuki; Taguchi, Tadashi; and Tsuchihashi, Yasuhiko, 5,160,447, Cl. 252-62.540.
Tsuchiya, Toshiaki, to Pioneer Electronic Corporation. Motor vehicle-mounted radio wave receiving GPS apparatus requiring no drill holes for mounting. 5,161,255, Cl. 455-345.000.
Tsuda, Akihiko: *See*—
Ijyuin, Makoto; Tsuda, Akihiko; and Nawata, Shinichi, 5,160,476, Cl. 264-563.000.
Tsuji, Hideaki, to Omron Corporation. Electromagnetic relay. 5,160,910, Cl. 335-129.000.
Tsujii, Gen; Kobayashi, Nobuo; and Takano, Fumitomo, to Honda Giken Kogyo Kabushiki Kaisha. Welding transformer and method of manufacturing same. 5,160,820, Cl. 219-116.000.
Tsujimoto, Sinichi: *See*—
Iwashita, Tomonori; and Tsujimoto, Sinichi, 5,160,953, Cl. 354-173.100.
Tsukamoto, Masahiro; and Kawabata, Kazunobu, to Nissan Motor Company, Limited. Working fluid circuit with line pressure control for vehicle active suspension system. 5,160,161, Cl. 280-707.000.
Tsunashima, Atsumu: *See*—
Kosuge, Katsunori; and Tsunashima, Atsumu, 5,160,718, Cl. 423-332.000.
Tsurumi, Toshinobu: *See*—
Takemori, Toshio; Tsurumi, Toshinobu; and Takagi, Masahiro, 5,160,760, Cl. 426-660.000.
Tsutsumitake, Hideyuki, to Kabushiki Kaisha Toshiba. List type data storing and retrieving system. 5,161,224, Cl. 395-600.000.
Tsutsunaka Plastic Kogyo Kabushiki Kaisha: *See*—
Ijyuin, Makoto; Tsuda, Akihiko; and Nawata, Shinichi, 5,160,476, Cl. 264-563.000.
Tsuyama, Toshiaki; Nobumoto, Kazutoshi; Kageyama, Fumio; and Okazaki, Haruki, to Mazda Motor Corporation. Slip control system for automotive vehicle. 5,159,991, Cl. 180-197.000.
Tsuzuku, Masayuki: *See*—
Kansi, Takashi; Miyazaki, Kunio; and Tsuzuku, Masayuki, 5,161,075, Cl. 360-99.040.
Tukiyama, Yasutaka; Itami, Tadashi; Okada, Yosuhiro; and Hamamoto, Syougo, to Matsushita Electric Industrial Co., Ltd. Driving apparatus of a brushless motor. 5,160,873, Cl. 318-254.000.
Tuma, Martin; and Brunclik, Vaclav. Automatic small arm. 5,160,796, Cl. 42-69.030.
Turgeon, Milton R.: *See*—
Ferraro, John R.; Foerster, Philip P.; Greenstreet, Peter T.; Schwarz, Steven R.; and Turgeon, Milton R., 5,160,101, Cl. 244-118.100.
Turnbull, John R., Jr.: *See*—
Pricer, Wilber D.; Faure, Thomas B.; Meyerson, Bernard S.; Nestork, William J.; and Turnbull, John R., Jr., 5,160,987, Cl. 257-307.000.
Tuunanen, Jukka; Narvanen, Ale; and Geysen, Mario, to Labsystems Oy. Washing device. 5,160,378, Cl. 134-25.100.
Tyrrell, Raymond E.: *See*—
Czerwiec, Richard M.; Tyrrell, Raymond E.; Sanders, Gus C.; Sutherland, Joseph E.; Sanders, Richard J., Jr.; Hurlocker, Claude M.; Thorne, Hal A.; Runyon, V. Paul; and Aro, Enn, 5,161,152, Cl. 370-84.000.
Tyton Corporation: *See*—
Ritzmann, James M., 5,160,811, Cl. 174-68.300.
Uarco Incorporated: *See*—
Greenawald, Michael A., 5,160,025, Cl. 206-333.000.
Ube Industries, Ltd.: *See*—
Harada, Takashi; Fujimura, Susumu; Higashiyama, Masahide; and Tokita, Hidetoshi, 5,160,038, Cl. 210-149.000.
Uchiyama, Shoichi: *See*—
Yokoyama, Osamu; and Uchiyama, Shoichi, 5,161,040, Cl. 359-19.000.

Uchiyama, Yuji: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Koyama, Yoshihisa; and Uchiyama, Yuji, 5,161,007, Cl. 358-43.000.
Uchman, Frederick J., to GKN Automotive, Inc. Tripod constant velocity joint having multiple component rollers. 5,160,297, Cl. 464-111.000.
Ueda, Noriyoshi; and Hayakawa, Kimiaki, to Canon Kabushiki Kaisha. Laminating apparatus. 5,160,399, Cl. 156-359.000.
Uekido, Kouzou: *See*—
Nakamura, Masaru; Uekido, Kouzou; and Ukai, Tsunekazu, 5,160,275, Cl. 439-328.000.
Uemura, Tomoyoshi: *See*—
Asano, Kuniyoshi; Uemura, Tomoyoshi; and Takida, Hiroshi, 5,160,475, Cl. 264-331.170.
Ueyoko, Kiyoshi; and Hoshino, Hiroshi, to Sumitomo Rubber Industries, Limited. High speed heavy duty tire including bead part with side packing rubber. 5,160,384, Cl. 152-454.000.
Uhlhorn, Robert J. R.: *See*—
Huis In't Veld, Marcel B. J.; Uhlhorn, Robert J. R.; Lin, Yve-Sheng; Keizer, Klaas; and Burggraaf, Anthonie J., 5,160,617, Cl. 210-490.000.
Ujiie, Mikio, to NEC Corporation. Satellite communications system operating in asynchronous mode for central-to-terminal station transmission. 5,161,194, Cl. 380-48.000.
Ukai, Tsunekazu: *See*—
Nakamura, Masaru; Uekido, Kouzou; and Ukai, Tsunekazu, 5,160,275, Cl. 439-328.000.
Ulrich, Robert R.: *See*—
Hyde, Glenn F.; and Ulrich, Robert R., 5,160,556, Cl. 148-525.000.
Ultrasonic Arrays, Inc.: *See*—
Kenney, Martin J., 5,161,128, Cl. 367-181.000.
Umeda, Masaru: *See*—
Ohmi, Tadahiro; Kawakami, Michiya; Shibata, Tadashi; and Umeda, Masaru, 5,160,429, Cl. 210-137.000.
Unifilt Corporation: *See*—
Walter, Thomas P., 5,160,613, Cl. 210-274.000.
Union Special Corporation: *See*—
Adamski, Maximilian, Jr.; Ruderman, Stephen; and Tegel, Robert G., 5,159,874, Cl. 112-262.300.
Unisys Corporation: *See*—
Malek-Khosravi, Behnam; McCullough, Matthew L.; and Domer, Steven M., 5,161,161, Cl. 371-28.000.
United Container Machinery Group, Inc.: *See*—
Hyde, Glenn F.; and Ulrich, Robert R., 5,160,556, Cl. 148-525.000.
Thomas, Charles E., 5,160,400, Cl. 156-382.000.
United States of America
Administrator, National Aeronautics and Space Administration: *See*—
Liu, Hua-Kuang, 5,161,027, Cl. 358-231.000.
Air Force: *See*—
Frederickson, Arthur R.; Nanevicz, Joseph E.; Thayer, Jeffrey S.; and Parkinson, Dean B., 5,160,374, Cl. 106-401.000.
Hutchin, Richard A., 5,161,045, Cl. 359-197.000.
Spry, Robert J., 5,161,068, Cl. 359-885.000.
Army: *See*—
Babbitt, Richard W.; and Stern, Richard A., 5,160,904, Cl. 333-34.000.
Thongs, Lawrence C., Jr., 5,160,392, Cl. 156-172.000.
Energy: *See*—
Bowman, Charles D., 5,160,696, Cl. 376-189.000.
Herring, J. Stephen, 5,160,911, Cl. 335-216.000.
Pierce, R. Dean; Ackerman, John P.; Battles, James E.; Johnson, Terry R.; and Miller, William E., 5,160,367, Cl. 75-397.000.
Interior: *See*—
Atkinson, Gary B.; Kuczynski, Robert J.; and Desmond, Dennis P., 5,160,711, Cl. 423-22.000.
National Aeronautics and Space Administration: *See*—
McKinnis Darin N., 5,160,233, Cl. 411-433.000.
Shakkottai, Parthasarathy; Kwack, Eug Y.; and Back, Lloyd, 5,159,843, Cl. 73-24.050.
Navy: *See*—
Alpers, Frederick C.; and Hoover, Mervyn C., 5,160,934, Cl. 342-351.000.
Detsch, Richard M., 5,160,438, Cl. 210-707.000.
Halsey, Carl C.; and Berry, Sharon L., 5,160,468, Cl. 264-112.000.
Maccabee, Bruce, 5,161,125, Cl. 367-99.000.
Moscrip, William M., 5,160,802, Cl. 89-16.000.
Olsen, Richard G., 5,160,828, Cl. 219-211.000.
Roehl, James S., 5,159,918, Cl. 126-437.000.
Travor, Bruce W.; Marshall, Frank P.; and Kraynak, Timothy L., 5,160,800, Cl. 89-1.570.
U.S. Philips Corporation: *See*—
Brand, Hans-Wolfgang; Klee, Mareike K.; De Vries, Johan W. C.; Waser, Rainer M.; and Wolters, Robertus A. M., 5,160,762, Cl. 427-79.000.
Druyvesteyn, Willem F.; Hoogendoorn, Abraham; Van De Kerkhof, Leon M.; and Veldhuis, Raymond N. J., 5,161,210, Cl. 395-2.000.
Egger, Jean, 5,161,004, Cl. 358-21.00R.
Hartman, Robert A.; and Sakai, Toru, 5,161,237, Cl. 359-54.000.
Hodulik, Wolfgang; and Ruyten, Henricus, 5,161,239, Cl. 360-137.000.
Mateika, Dieter; and Volkel, Erich, 5,160,401, Cl. 156-600.000.
Moran, David; and Morris, Octavius J., 5,161,205, Cl. 382-56.000.
Pletz-Kirsch, Gerhard; and Lenth, Jurgen, 5,161,011, Cl. 358-148.000.
Roschmann, Peter K. H., 5,160,890, Cl. 324-314.000.
Sato, Takashi, 5,161,017, Cl. 358-166.000.
Scheidegger, Markus B.; and Bosiger, Peter, 5,160,889, Cl. 324-309.000.
Veigl, Johann, 5,161,078, Cl. 360-106.000.
Wiefferink, Theodorus G. L., 5,160,975, Cl. 356-326.000.
United States Surgical Corporation: *See*—
Gravener, Roy D.; and Muth, Ross R., 5,160,677, Cl. 264-101.000.
Gravener, Roy D.; and Muth, Ross R., 5,160,678, Cl. 264-101.000.
United Technologies, Corp.: *See*—
Ferraro, John R.; Foerster, Philip P.; Greenstreet, Peter T.; Schwarz, Steven R.; and Turgeon, Milton R., 5,160,101, Cl. 244-118.100.
Perkins, Gary M.; Podolsky, Donald M.; and Kana, James J., 5,160,096, Cl. 60-39.050.
University of Florida: *See*—
Clark, David E.; and Wistrom, Kenneth W., 5,160,455, Cl. 252-315.700.
University of Kentucky Research Foundation, The: *See*—
DeLuca, Patrick P.; and Rypacek, Frantisek, 5,160,745, Cl. 424-487.000.
University of Rochester: *See*—
Krill, Daniel M.; and Moore, Duncan T., 5,161,063, Cl. 359-654.000.
University of Tennessee Research Corporation, The: *See*—
Postlethwaite, Arnold E.; Seyer, Jerome M.; and Kang, Andrew H., 5,160,483, Cl. 424-85.100.
University of Texas System, The: *See*—
Bell, Ronald D.; Gardiner, William C.; Howell, John R.; Matthews, Ronald D.; and Nichols, Steven P., 5,160,254, Cl. 431-7.000.
Huff, G. David; and Rodkey, L. Scott, 5,160,594, Cl. 204-182.900.
University of Virginia Alumni Patents Foundation: *See*—
Shur, Michael; and Lee, Kwyro, 5,161,235, Cl. 257-24.000.
UOP: *See*—
Holmgren, Jennifer S.; Gembicki, Stanley A.; Schoonover, Michael W.; and Kocal, Joseph A., 5,160,032, Cl. 208-46.000.
Koves, William J., 5,160,513, Cl. 55-74.000.
Lambert, Susan L.; and Schoonover, Michael W., 5,160,493, Cl. 502-231.000.
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 5,160,717, Cl. 423-704.000.
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Up-Right International Manufacturing, Ltd.: *See*—
Claxton, Gerald L., 5,159,989, Cl. 180-41.000.
Urabe, Yoshihiko; and Ohba, Toshio, to Fuji Photo Film Co., Ltd.; and Shin-Etsu Chemical Co., Ltd. Plate surface correcting solution for dry lithographic printing plate. 5,159,879, Cl. 101-465.000.
Urasaki, Shuji: *See*—
Mochizuki, Mitsuru; Takagi, Tadashi; and Urasaki, Shuji, 5,160,984, Cl. 257-277.000.
Urayama, Kiyoshi; and Sato, Masanori, to Sony Corporation. Mold for forming a tape cassette reel. 5,160,752, Cl. 425-577.000.
Usher, David R.: *See*—
Kuykendal, Robert L.; Usher, David R.; and Deichmann, Ronald S., 5,160,086, Cl. 239-18.000.
Usinor Sacilor: *See*—
Larreco, Michel M.; Spiquel, Jacques M.; and Tavernier, Herve, 5,159,969, Cl. 164-415.000.
Usui Kokusai Sangyo Kaisha Limited: *See*—
Washizu, Katsushi, 5,160,177, Cl. 285-319.000.
USX Corporation: *See*—
Vassilicos, Achilles, 5,160,480, Cl. 266-275.000.
Utah Medical Products, Inc.: *See*—
Billings, R. Gail; Wallace, William D.; Cutler, Christopher A.; and Cook, B. Tod, 5,160,334, Cl. 606-34.000.
Utsumi, Minoru: *See*—
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Utsumi, Noriyuki, to Tokico, Ltd. Position detection device. 5,160,977, Cl. 356-376.000.
Uzawa, Shunichi: *See*—
Ebinuma, Ryuichi; Ozawa, Kunitaka; Kariya, Takao; Uzawa, Shunichi; and Nose, Noriyuki, 5,161,176, Cl. 378-34.000.
Marumo, Mitsuji; Iwamoto, Kazunori; Mizusawa, Nobutoshi; Kariya, Takao; and Uzawa, Shunichi, 5,160,961, Cl. 355-53.000.
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Valiant Machine & Tool Inc.: *See*—
Noestheden, Andrew, 5,160,605, Cl. 210-97.000.
Valmet Paper Machinery Inc.: *See*—
Rantanen, Rauno, 5,159,893, Cl. 118-227.000.
Van Epenhuysen Chemische Fabrieken b.v.: *See*—
Van Benthem, Jan; and Van Etten, Koos, 5,160,753, Cl. 426-2.000.
Van Benthem, Jan; and Van Etten, Koos, to Van Epenhuysen Chemische Fabrieken b.v. Method of preparing an aqueous food supplement for cattle and thus prepared food supplement. 5,160,753, Cl. 426-2.000.

Van Buren, Martin W.: *See*—
Scheremet, William; and Van Buren, Martin W., 5,160,322, Cl. 604-122.000.
Vance Products Incorporated: *See*—
Stines, Joseph R., 5,160,327, Cl. 604-224.000.
Vancsik, Frank J., to Budd Company, The. Process for press fitting a vehicle wheel hub into an integral bearing. 5,159,754, Cl. 29-898.070.
Van De Kerkhof, Leon M.: *See*—
Druyvesteyn, Willem F.; Hoogendoorn, Abraham; Van De Kerkhof, Leon M.; and Veldhuis, Raymond N. J., 5,161,210, Cl. 395-2.000.
van den Berg, Teunis T.: *See*—
Cegielski, Michael J.; and van den Berg, Teunis T., 5,159,924, Cl. 128-203.120.
van de Pas, Johannes C.: *See*—
Donker, Cornelis B.; Hull, Michael; and van de Pas, Johannes C., 5,160,655, Cl. 252-95.000.
Van Der Herberg, Jan W. Centrifugal separator with discharge of separated constituents by braking moment. 5,160,609, Cl. 210-143.000.
Van Der Hoeven, Martin A. Musculature exercising apparatus. 5,160,304, Cl. 482-128.000.
Van Etten, Koos: *See*—
Van Benthem, Jan; and Van Etten, Koos, 5,160,753, Cl. 426-2.000.
Van Loo, William C.: *See*—
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Van Nostrand, Scott L., to Eastman Kodak Company. Multi-memory bank system for receiving continuous serial data stream and monitoring same to control bank switching without interrupting continuous data flow rate. 5,161,221, Cl. 395-425.000.
Varner, James E., Sr.; and DePriest, June W. Portable apparatus for sharpening blades. 5,159,784, Cl. 51-173.000.
Vartuli, James C.: *See*—
Chu, Pochen; Klocke, Donald J.; Marler, David O.; McWilliams, John P.; and Vartuli, James C., 5,160,500, Cl. 585-486.000.
Vasquez, Patrica: *See*—
Latchford, Ian S.; Vasquez, Patrica; Hemker, David J.; and Petit, Brigitte, 5,160,407, Cl. 156-656.000.
Vassilakis, James G.; Best, Donald F.; Skeels, Gary W.; and Flanigen, Edith M., to UOP. Octane gasoline catalyst and process using same in a hydrocracking process. 5,160,033, Cl. 208-111.000.
Vassilicos, Achilles, to USX Corporation. Tundish turbulence suppressor pad. 5,160,480, Cl. 266-275.000.
Vasudev, P. K.: *See*—
Welkowsky, Murray S.; Vasudev, P. K.; Reif, Philip G.; and Goodwin, Norman W., 5,160,560, Cl. 156-154.000.
Vauhkonen, Reijo, to Suomen Vuolukivi Oy. Corner joint for building units of stone. 5,160,212, Cl. 403-294.000.
Vega, Joseph G., Jr. Second chance secondary smoke trap. 5,160,518, Cl. 55-385.800.
Veigl, Johann, to U.S. Philips Corporation. Magnetic tape system including a rotatable head support for rotating the magnetic head of the system through substantially 180°. 5,161,078, Cl. 360-106.000.
Veldhuis, Raymond N. J.: *See*—
Druyvesteyn, Willem F.; Hoogendoorn, Abraham; Van De Kerkhof, Leon M.; and Veldhuis, Raymond N. J., 5,161,210, Cl. 395-2.000.
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Velenyi, Louis J.: *See*—
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Venas, Karl: *See*—
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Venetianer, Pal: *See*—
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Verdier, Michel; and Mortgat, Regis, to Framatome; and Cogema. Lower connector for a fuel assembly of a nuclear reactor, comprising an adaptor plate and a filtration plate. 5,160,697, Cl. 376-352.000.
Vergola International Pty. Ltd.: *See*—
Rossiter, Anthony L., 5,159,783, Cl. 49-403.000.
Verhoog, Roel: *See*—
Fourrey, Francois; and Verhoog, Roel, 5,160,167, Cl. 280-806.000.
Vestal, Marvin L. Time-of-flight analyzer and method. 5,160,840, Cl. 250-287.000.
Viands, Carla A.: *See*—
Potember, Richard S.; Yamaguchi, Shoji; and Viands, Carla A., 5,161,149, Cl. 369-126.000.
Victor Company of Japan, Ltd.: *See*—
Ichimura, Hiroshi; Minema, Ikumi; and Katase, Wataru, 5,161,022, Cl. 358-190.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Asakura, Tsutou; Furuya, Masato; Koyama, Yoshihisa; and Uchiyama, Yuji, 5,161,007, Cl. 358-43.000.
Victory, Sidney P., Jr., to Hudson Products Corporation. Steam condenser with articulated electrically heated blankets or panels. 5,159,974, Cl. 165-96.000.
Viertel, Lothar; and Welter, Patrick, to Gebr. Happich GmbH. Mirror support for a sun visor for automotive vehicles. 5,160,203, Cl. 362-141.000.
Villiger, Alois: *See*—
Schadt, Martin; and Villiger, Alois, 5,160,661, Cl. 252-299.610.
Vincent, Vernon L., to INAMED Development Co. Device for removing implantable articles. 5,160,338, Cl. 606-157.000.
Vinson, Bobby: *See*—
Kay, Mark L.; Loveless, Rodger D.; and Vinson, Bobby, 5,160,347, Cl. 8-481.000.
Vio, Fabio: *See*—
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Virnelson, R. Craig: *See*—
Cohen, Joel A.; and Virnelson, R. Craig, 5,160,826, Cl. 250-339.000.
Virtue, Michael D., to Indiana Tube Corporation. Heat transfer device. 5,159,976, Cl. 165-144.000.
Visser's-Gravendeel Holding B.V.: *See*—
Bikow, Nikolaus, 5,160,235, Cl. 414-416.000.
Visuri, Pauli, to Nokia Mobile Phones Ltd. Method to speed up the training of a shift oscillator in a frequency synthesizer. 5,160,900, Cl. 331-18.000.
Vives, Michel; and Limousin, Jean L., to Societe Europeenne de Propulsion. Process for manufacturing a thermostructural composite by chemical vapor deposition using linking threads. 5,160,471, Cl. 264-136.000.
Vocke, Peter; Mahlo, Thomas; and Strigl, Reinhard, to Linde Aktiengesellschaft. Process for improved preparation of treatment gas in heat treatments. 5,160,380, Cl. 148-206.000.
Voelkel, Steven A., to W. R. Grace & Co.-Conn. Cryopreservation process for direct transfer of embryos. 5,160,312, Cl. 600-34.000.
VOEST-ALPINE Automotive Gesellschaft m.b.H.: *See*—
Weiss, Gerhard; and Baumgartner, Peter, 5,160,088, Cl. 239-88.000.
Voigt, Bernard. Container with a tube insert. 5,159,999, Cl. 190-111.000.
Volkel, Erich: *See*—
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Von Roll AG: *See*—
Spiess, Hansruedi; and Galvanetto, Francois, 5,160,213, Cl. 404-25.000.
von Benda, Klaus; and Benczur-Urmossy, Gabor, to Deutsche Automobilgesellschaft mbH. Paste for the vibration filling of foam-structure and fiber-structure electrode plates for galvanic cells. 5,160,659, Cl. 252-182.100.
von Huene, Bernhard: *See*—
Deugo, L. Scott; Mansfield, Andrew; Salzman, Michael; von Huene, Bernhard; and von Huene, Eberhard, 5,159,793, Cl. 52-126.100.
von Huene, Eberhard: *See*—
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Vosper, George W. Spill free clean out traps. 5,159,724, Cl. 4-679.000.
Voss, Peter: *See*—
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W. L. Gore & Associates, Inc.: *See*—
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Sassa, Robert L., 5,160,773, Cl. 428-76.000.
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Gianelli, Gian C., 5,159,800, Cl. 53-492.000.
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W. Schlafhorst AG & Co.: *See*—
Schippers, Norbert; Raasch, Hans; Gobbels, Heinz-Dieter; and Preutenborbeck, Maximilian, 5,159,804, Cl. 57-261.000.
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Wada, Minoru; Tanaka, Yoshiaki; Katoh, Hiroshi; and Taguchi, Hiroshi, to Komatsu Zenoah Kabushiki Kaisha. Engine starter. 5,159,845, Cl. 74-6.000.
Wada, Satoshi; Wakabayashi, Shinichi; and Fukuda, Masayo, to Kabushiki Kaisha Toshiba. Semiconductor IC device with dummy wires. 5,160,995, Cl. 257-207.000.
Wada, Shunichi, to Mitsubishi Denki K.K. Ultrasonic wave obstacle sensor. 5,159,837, Cl. 73-602.000.
Wada Ventures: *See*—
White, Wade, 5,159,832, Cl. 73-151.000.
Wada, Yukihito: *See*—
Tonariya, Yoshito; Wada, Yukihito; Yamaguchi, Kazuhiro; Yamazaki, Tomio; Sakai, Isamu; Yokoi, Shigeru; Togashi, Mitsuo; and Noguchi, Yukihiro, 5,160,724, Cl. 424-4.000.
Wagenknecht, Marcel H., to Jaquet Orthopedie S.A. Pin holder support. 5,160,335, Cl. 606-59.000.
Waggener, William N., Jr., to Fairchild Weston Systems, Inc. Floating point conversion device and method. 5,161,117, Cl. 364-715.030.
Wagner, Ann L.: *See*—
Dodge, Richard N., II; Wagner, Ann L.; Fowler, Larry C.; Allen, Martin A.; and Fetcko, John T., III, 5,160,746, Cl. 425-7.000.
Wahner, Gero; and Girke, Dieter, to Mauser-Werke Oberndorf GmbH; and Dynamit Nobel AG. Fin-stabilized projectile. 5,160,804, Cl. 102-443.000.
Wainer, Susan E., to JMI Software Consultants Inc. Microprocessor inverse processor state usage. 5,161,226, Cl. 395-650.000.
Wakabayashi, Shinichi: *See*—
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Wakabayashi, Takao: *See*—
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Wakabayashi, Toshikazu: *See*—
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Walker, Fritz: *See*—
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Walker, Nicholas G.: *See*—
Eckert, Charles E.; and Walker, Nicholas G., 5,160,693, Cl. 266-235.000.

Walker, William T. Tie-down device for cargo and the like. 5,159,729, Cl. 24-68.0CD.

Wall, Michael F.: *See*—
Anderson, Janeen D. W.; Mead, Carver A.; Allen, Timothy P.; and Wall, Michael F., 5,160,899, Cl. 330-288.000.

Wallace, Rebecca A.: *See*—
Bosworth, Mark E.; Dunn, Thomas J.; Hall, Warren E.; Johnson, Richard G.; Kneller, Mills T.; Lin, Youlin; Wallace, Rebecca A.; White, David H.; and Wong, David M., 5,160,437, Cl. 210-651.000.

Wallace, William D.: *See*—
Billings, R. Gail; Wallace, William D.; Cutler, Christopher A.; and Cook, B. Tod, 5,160,334, Cl. 606-34.000.

Wallach, Donald F. H.; and Mathur, Rajiv, to Micro Vesicular Systems, Inc. Method of making oil filled paucilamellar lipid vesicles. 5,160,669, Cl. 264-4.300.

Walls, Edward W., Jr.: *See*—
Login, Robert; Bires, Carmen D.; and Walls, Edward W., Jr., 5,160,729, Cl. 424-47.000.

Walt Disney Company, The: *See*—
Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,161,104, Cl. 364-410.000.

Walter, Bruce A.: *See*—
Krug, John A.; Willis, William L.; Dumser, Paul J.; Casseau, William U.; Deet, William T.; Culligan, Laurence E.; and Walter, Bruce A., 5,159,882, Cl. 105-362.000.

Walter, Helmut: *See*—
Mayer, Horst; Hamprecht, Gerhard; Westphalen, Karl-Otto; Walter, Helmut; and Gerber, Matthias, 5,160,365, Cl. 71-93.000.

Walter, Thomas P., to Unifilt Corporation. Purification underdrain with compensating chamber and baffle isolating backwash gas from backwash water. 5,160,613, Cl. 210-274.000.

Walters, David L.; Healy, Martin; Marlow, Ernest C.; and Harrison, David F., to STC PLC. Apparatus for controlling deployment of a cable. 5,160,972, Cl. 356-32.000.

Waltrip, Donald W.; and Carter, Gordon, to Akzo Coatings, Inc. Process for applying a high solid coating composition using a high pressure airless spray. 5,160,766, Cl. 427-384.000.

Wang Laboratories, Inc.: *See*—
Knowlton, Kenneth C., 5,161,213, Cl. 395-128.000.

Wang, Ping: *See*—
Owen, William H.; Caywood, John; Drori, Joseph; Jaffe, James; Nojima, Isao; Sung, Jeffrey; and Wang, Ping, 5,161,157, Cl. 371-10.200.

Wang, Shih-Yuan; and Renne Ty Tan, Michael, to Hewlett-Packard Company. Buried isolation using ion implantation and subsequent epitaxial growth. 5,160,492, Cl. 437-22.000.

Wang, Wen-Chang. Fountain faucet. 5,159,950, Cl. 137-390.000.

Ward Holding Company, Inc.: *See*—
Siriporn, Charn; Milcarek, Charles S., Jr.; Norman, Ronald J.; Baum, Randon L.; and Holecek, Michael G., 5,160,129, Cl. 271-178.000.

Ward, Ian M.; Woods, Denis W.; and Busfield, Walter K., to National Research Development Corporation. Polymer irradiation. 5,160,464, Cl. 264-22.000.

Warner-Lambert Company: *See*—
Klohs, Wayne; and Ramu, Avner, 5,160,727, Cl. 424-10.000.

Warner, Michael V. Apparatus for moving an indexing table. 5,159,846, Cl. 74-69.000.

Waschkies, Eckhard; and Hepp, Klaus, to Fraunhofer-Gesellschaft zur Forderung Der Angewandten Forschung E.V. Process and device for monitoring the chip-removing treatment of a workpiece. 5,159,836, Cl. 73-587.000.

Waser, Rainer M.: *See*—
Brand, Hans-Wolfgang; Klee, Mareike K.; De Vries, Johan W. C.; Waser, Rainer M.; and Wolters, Robertus A. M., 5,160,762, Cl. 427-79.000.

Washington Suburban Sanitary Commission: *See*—
Murray, Charles M.; Thompson, Joel L.; and Hentz, Lawrence H., Jr., 5,160,707, Cl. 422-170.000.

Washizu, Katsuhi, to Usui Kokusai Sangyo Kaisha Limited. Connector for connecting slender piping members with cantilever mechanism. 5,160,177, Cl. 285-319.000.

Waste Safety International, Inc.: *See*—
Titmas, James A., 5,160,581, Cl. 162-61.000.

Wat, Pamela K.: *See*—
Jao, Frank; Wong, Patrick S.; Huynh, Hoa T.; McChesney, Kathy; and Wat, Pamela K., 5,160,744, Cl. 424-473.000.

Watanabe, Kenji; Sekiguchi, Tetsuo; and Shishido, Takayasu, to Asahi Kogaku Kogyo Kabushiki Kaisha. Lens barrel with screw mount. 5,160,956, Cl. 354-286.000.

Watanabe, Nobuatsu: *See*—
Kondo, Teruhisa; Tojo, Tetsuro; and Watanabe, Nobuatsu, 5,160,415, Cl. 204-60.000.

Watanabe, Tetsuya: *See*—
Satoh, Masahiro; Watanabe, Tetsuya; Yoshio, Kunikiyo; and Kishiki, Hiroshi, 5,160,662, Cl. 252-299.610.

Watanabe, Toshiaki: *See*—
Tanno, Masayuki; Watanabe, Toshiaki; and Ryuo, Toshihiko, 5,161,049, Cl. 359-281.000.

Watanabe, Yasuhiko: *See*—
Taniguchi, Naohiro; Koike, Syuzo; Watanabe, Yasuhiko; Takeuchi, Tadao; and Fujiwara, Noboru, 5,160,041, Cl. 210-205.000.

Watanabe, Yoshikazu: *See*—
Takahashi, Hideki; Tani, Shigemitsu; Fukano, Akira; Katakura, Kazuto; Makimoto, Hitoshi; and Watanabe, Yoshikazu, 5,160,964, Cl. 355-200.000.

Watanabe, Yoshitaka, to Kabushiki Kaisha Toshiba. Data write control circuit having word length conversion function. 5,161,220, Cl. 395-425.000.

Watkins, John; Van Loo, William C.; Michels, Kurt; and Chang, Hugh, to Sun Microsystems, Inc. Method and apparatus for system bus testability through loopback. 5,161,162, Cl. 371-29.500.

Watlington, Thomas M.: *See*—
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,979, Cl. 356-423.000.
Ota, Hiroyuki; Terada, Takao; Herpichboehm, Bernd G.; Sierra, George H.; Summers, Robert B.; and Watlington, Thomas M., 5,160,980, Cl. 356-423.000.

Watson, James S., to Calcomp Inc. Cordless digitizer local conductor phase reference system. 5,160,813, Cl. 178-19.000.

Watz, Walter, to Leica Camera GmbH. Camera lens. 5,161,060, Cl. 359-642.000.

Wayte, Peter: *See*—
Herzner, Fredrick C.; Juenger, Jerome A.; and Wayte, Peter, 5,160,243, Cl. 416-220.00R.

Weatherford/Lamb, Inc.: *See*—
Pietras, Bernd-Georg, 5,159,860, Cl. 81-57.190.

Weaver, Stanton E., Jr.: *See*—
Gorczyca, Thomas B.; Weaver, Stanton E., Jr.; and Wojnarowski, Robert J., 5,161,093, Cl. 361-414.000.

Weaver, William C. Ozone generation apparatus. 5,160,481, Cl. 422-186.070.

Wechsler, Monroe S.; and Carey, Scott T., to Iowa State University Research Foundation, Inc. Energy beam position detector. 5,160,917, Cl. 340-686.000.

Wedemeyer, Arlan B.; and Wedemeyer, Joseph B. Insert for a table saw. 5,159,864, Cl. 83-13.000.

Wedemeyer, Joseph B.: *See*—
Wedemeyer, Arlan B.; and Wedemeyer, Joseph B., 5,159,864, Cl. 83-13.000.

Weeden, Kim. Hot beverage producing device. 5,159,873, Cl. 99-279.000.

Wegen, Hans-Werner: *See*—
Metzner, Wolfgang; Pallaske, Michael; and Wegen, Hans-Werner, 5,159,778, Cl. 43-121.000.

Weid, Helmut; and Held, Peter, to Wolf-Gerate G.m.b.H. Vertriebsgesellschaft KG. Hand shears, particularly branch, hedge and/or garden shears. 5,159,757, Cl. 30-251.000.

Weigert, Fidelo; and Reininger, Matthias G., to AMP Incorporated. Wire transfer device for lead making machine. 5,159,749, Cl. 29-742.000.

Weigt, Josef: *See*—
Eyermann, Manfred; and Weigt, Josef, 5,159,908, Cl. 123-179.100.

Weill, Jerome: *See*—
Alagy, Jacques; Broutin, Paul; Busson, Christian; and Weill, Jerome, 5,160,501, Cl. 585-500.000.

Weinstein, Robert M., to Firmenich S.A. Process for the preparation of cyclohexanol derivatives. 5,160,498, Cl. 568-834.000.

Weiss, Gerhard; and Baumgartner, Peter, to VOEST-ALPINE Automotive Gesellschaft m.b.H. Injection pump for diesel engines. 5,160,088, Cl. 239-88.000.

Welborn, James C., Jr.: *See*—
Horton, Dwayne; and Welborn, James C., Jr., 5,159,776, Cl. 43-24.000.

Welch, V. Richard: *See*—
Marsh, John K.; and Welch, V. Richard, 5,160,276, Cl. 439-502.000.

Welkowsky, Murray S.; Vasudev, P. K.; Reif, Philip G.; and Goodwin, Norman W., to Hughes Aircraft Company. Method of producing optically flat surfaces on processed silicon wafers. 5,160,560, Cl. 156-154.000.

Wells, John R., to Solco Hospital Products Group, Inc. Method for mixing blood with anticoagulant. 5,160,333, Cl. 604-408.000.

Welt, Sydney; Divgi, Chaitanya R.; Yeh, Samual; Old, Lloyd J.; Oettgen, Herbert F.; Real, Francisco X.; and Sakamoto, Junichi, to Sloan-Kettering Institute For Cancer Research. Method of imaging colorectal carcinoma lesion and composition for use therein. 5,160,723, Cl. 424-1.100.

Welter, Patrick: *See*—
Viertel, Lothar; and Welter, Patrick, 5,160,203, Cl. 362-141.000.

Wendell, Dennis L., to National Semiconductor Corporation. Synchronous internal clock distribution. 5,160,859, Cl. 307-475.000.

Wendler, Walter H.: *See*—
Smith, Gaylord D.; Wendler, Walter H.; and O'Donnell, David B., 5,160,382, Cl. 148-327.000.

Wera-Werk Hermann Werner GmbH & Co.: *See*—
Garschagen, Friedrich A.; and Heym, Hans-Udo, 5,159,741, Cl. 29-27.00R.

Werner, Jeffrey A.: *See—*
Chang, Yen C.; and Werner, Jeffrey A., 5,161,119, Cl. 364-786.000.
Wernli, Jorg, to Rieter Machine Works, Ltd. Guide arrangement for peg trays on a ring spinning machine. 5,159,805, Cl. 57-281.000.
Werton, Donna L. Two component teether. 5,160,344, Cl. 606-235.000.
West Point Pepperell: *See—*
Smith, Richard D., 5,160,503, Cl. 8-115.700.
Westerson, Kevin W.: *See—*
Williams, John C.; Westerson, Kevin W.; Muntean, George L.; and Sullivan, Thomas W., 5,159,911, Cl. 123-467.000.
Westfall, Norman R.: *See—*
Habbersett, John I.; and Westfall, Norman R., 5,159,794, Cl. 52-207.000.
Westinghouse Electric Corp.: *See—*
Brown, Wilmott G., 5,160,242, Cl. 416-193.00A.
Nafziger, Steven; and McMennamy, John A., 5,159,835, Cl. 73-584.000.
Rorke, A. Brooks; Bullwinkle, Wallace C.; Stephens, William I.; Reuter, Robert E.; and Rizzi, John J., 5,160,188, Cl. 312-196.000.
Westmore, Richard J., to STC PLC. Synchronous network. 5,161,153, Cl. 370-94.300.
Westphalen, Karl-Otto: *See—*
Mayer, Horst; Hamprecht, Gerhard; Westphalen, Karl-Otto; Walter, Helmut; and Gerber, Matthias, 5,160,365, Cl. 71-93.000.
Westvaco Corporation: *See—*
Schilling, Peter, 5,160,453, Cl. 252-311.500.
Westwick, Alan L., to Motorola, Inc. Digital frequency synthesizer and method of frequency synthesis. 5,160,894, Cl. 328-14.000.
Whelen Technologies, Inc.: *See—*
Lyons, Harold W.; and Stopa, James L., 5,160,874, Cl. 318-268.000.
Whiddon, Richard, to Reliance Electric Industrial Company. Mount for drive means and speed control means. 5,160,113, Cl. 248-638.000.
Whipple, Richard B., to Gas Services, Inc. Closed loop proportional-integral fluid flow controller and method. 5,161,100, Cl. 364-160.000.
Whirlpool Corporation: *See—*
Willis, James L.; and Giordano, James R., 5,160,094, Cl. 62-137.000.
White Consolidated Industries, Inc.: *See—*
Holland, James R.; and Hoffman, Charles J., 5,160,191, Cl. 312-405.100.
White, David H.: *See—*
Bosworth, Mark E.; Dunn, Thomas J.; Hall, Warren E.; Johnson, Richard G.; Kneller, Mills T.; Lin, Youlin; Wallace, Rebecca A.; White, David H.; and Wong, David M., 5,160,437, Cl. 210-651.000.
White, Wade, to Wada Ventures. Indicating device. 5,159,832, Cl. 73-151.000.
Whitesell, David E. Shingle lifting tool. 5,159,859, Cl. 81-45.000.
Whitney, Colin G.; and Cameron, Bruce A., to Hughes Aircraft Company. Simultaneous dual field of view sensor. 5,161,051, Cl. 359-351.000.
Whitt, Riley S.; Bridges, William L.; and Johnson, Marshall L., to Milliken Research Corporation. Apparatus for cleaning rolls. 5,159,734, Cl. 15-883.000.
Wiefferink, Theodorus G. L., to U.S. Philips Corp. Spectrometer comprising a slit box. 5,160,975, Cl. 356-326.000.
Wiegner, Dieter: *See—*
Hoppe, Manfred; Wiegner, Dieter; Sagner, Klaus-Peter; Jordan, Heinz D.; and Brandt, Horst, 5,160,348, Cl. 8-639.000.
Wiesler, Oren: *See—*
DeRosa, John; Hagstrom, Lauren M.; Hilde, Lon S.; and Wiesler, Oren, 5,160,922, Cl. 340-825.500.
Wiktor, Dominik M.; and Schlindwein, Siegfried, to Automatic Switch Company. Electrical switch contact arrangement having quick break arcing contacts. 5,160,817, Cl. 200-146.00R.
Williams, John C.; Westerson, Kevin W.; Muntean, George L.; and Sullivan, Thomas W., to Cummins Engine Company, Inc. Hot start open nozzle fuel injection systems. 5,159,911, Cl. 123-467.000.
Williams, Randolph C.; and Bouchard, Arthur, II, to New Venture Gear, Inc. Sector plate for transfer case. 5,159,847, Cl. 74-337.500.
Williams, Richard M.: *See—*
Macaulay, Ernest W.; and Williams, Richard M., 5,160,738, Cl. 424-401.000.
Willingham, Gary L.: *See—*
Law, Andrew B.; and Willingham, Gary L., 5,160,527, Cl. 71-67.000.
Willis, James L.; and Giordano, James R., to Whirlpool Corporation. Recoverable domestic ice maker. 5,160,094, Cl. 62-137.000.
Willis, William L.: *See—*
Krug, John A.; Willis, William L.; Dumser, Paul J.; Casseau, William U.; Deet, William T.; Culligan, Laurence E.; and Walter, Bruce A., 5,159,882, Cl. 105-362.000.
Wilson, Brown L., to Oil Dynamics, Inc. Centrifugal pump with modular bearing support for pumping fluids containing abrasive particles. 5,160,240, Cl. 415-170.100.
Wilson, Richard K.: *See—*
Schneider, J. Wayne; Richan, K. Brook; and Wilson, Richard K., 5,161,116, Cl. 364-551.010.
Windmere Corporation: *See—*
Thaler, Arnold; Saud, Ivan; and Yip, P. C., 5,160,831, Cl. 219-506.000.
Winkelman, Manfred: *See—*
Rothfuss, Hans; Metzger, Herbert; Winkelman, Manfred; Winkler, Hans G.; and Kopia, Jochen, 5,160,478, Cl. 266-200.000.
Winkler, Hans G.: *See—*
Rothfuss, Hans; Metzger, Herbert; Winkelman, Manfred; Winkler, Hans G.; and Kopia, Jochen, 5,160,478, Cl. 266-200.000.
Winn, Laurence B., to Allied-Signal Inc. Seal rotor mount. 5,160,149, Cl. 277-85.000.
Winter, Heinrich, to SKF GmbH. Rolling mill with a multi-row bearing. 5,159,742, Cl. 29-129.000.
Winter, Robin R.: *See—*
Clay, Dale L.; Allington, Robert W.; Jameson, Daniel G.; and Winter, Robin R., 5,160,624, Cl. 210-634.000.
Winter, Udo. Projectile. 5,160,805, Cl. 102-518.000.
Wireman, Daniel R.: *See—*
Wireman, Jack; and Wireman, Daniel R., 5,159,764, Cl. 34-57.00E.
Wireman, Jack; and Wireman, Daniel R., to Blaw Knox Food and Chemical Equipment Co., Inc. Apparatus for conditioning particulate material. 5,159,764, Cl. 34-57.00E.
Wisconsin Alumni Research Foundation: *See—*
Reps, Thomas; Horwitz, Susan; and Binkley, David, 5,161,216, Cl. 395-375.000.
Wistrom, Kenneth W.: *See—*
Clark, David E.; and Wistrom, Kenneth W., 5,160,455, Cl. 252-315.700.
Wiszniewski, Virginia C.: *See—*
Cardis, Angeline B.; Goyal, Arjun K.; Shanholtz, Carl E.; and Wiszniewski, Virginia C., 5,160,649, Cl. 252-47.500.
Wittchow, Eberhard: *See—*
Franke, Joachim; Kefer, Volker; and Wittchow, Eberhard, 5,159,897, Cl. 122-367.300.
Wittek, Jurgen: *See—*
Basse, Hartwig; and Wittek, Jurgen, 5,160,395, Cl. 156-269.000.
Wittel, Kalus-Werner: *See—*
Rein, Rudiger; Jentsch, Dieter; and Wittel, Kalus-Werner, 5,160,551, Cl. 148-254.000.
Wittmann, Manfred: *See—*
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WNM Ventures Inc.: *See—*
Klappert, Walter R., 5,161,034, Cl. 358-342.000.
Wohlmut, Peter G.: *See—*
Hutcheson, Timothy L.; Or, Wilson; Narayanan, Venkatesh; Mohan, Subramaniam; Wohlmut, Peter G.; Srinivasan, Ramanujam; Hunt, Bobby R.; and Ryan, Thomas W., 5,161,204, Cl. 382-16.000.
Wojnarowski, Robert J.: *See—*
Gorczyca, Thomas B.; Weaver, Stanton E., Jr.; and Wojnarowski, Robert J., 5,161,093, Cl. 361-414.000.
Wolf-Gerate G.m.b.H. Vertriebsgesellschaft KG: *See—*
Weid, Helmut; and Held, Peter, 5,159,757, Cl. 30-251.000.
Wolf, Jurgen: *See—*
Jestadt, Albrecht; Schafer, Gerhard; and Wolf, Jurgen, 5,159,755, Cl. 30-43.920.
Wolfe, David R.: *See—*
O'Hara, John; Fuhrman, Fred L.; Wolfe, David R.; and Irwin, Bruce C., 5,160,259, Cl. 432-37.000.
Wolfe, John C.: *See—*
Stumbo, David P.; Wolfe, John C.; and Randall, John N., 5,160,845, Cl. 250-491.100.
Wolff, Paul A.: *See—*
Owen, S. Hudson; Baldwin, Roger A.; Taylor, Gerald E.; and Wolff, Paul A., 5,160,084, Cl. 238-310.000.
Wollbeck, Rudi; and Zang, Thomas, to Akzo N.V. Hollow fiber module. 5,160,673, Cl. 264-45.100.
Wolters, Robertus A. M.: *See—*
Brand, Hans-Wolfgang; Klee, Mareike K.; De Vries, Johan W. C.; Waser, Rainer M.; and Wolters, Robertus A. M., 5,160,762, Cl. 427-79.000.
Womack, Robert E., to Babcock & Wilcox Company, The. Serpentine tube inspection positioning spine. 5,159,849, Cl. 74-502.300.
Wong, Charles Y. H. Palm sized air conditioner. 5,159,819, Cl. 62-419.000.
Wong, David M.: *See—*
Bosworth, Mark E.; Dunn, Thomas J.; Hall, Warren E.; Johnson, Richard G.; Kneller, Mills T.; Lin, Youlin; Wallace, Rebecca A.; White, David H.; and Wong, David M., 5,160,437, Cl. 210-651.000.
Wong, James; and Rudziak, Mark K., to Composite Materials Technology, Inc. Superconductor and process of manufacture. 5,160,550, Cl. 148-96.000.
Wong, James; Rudziak, Mark K.; and Capone, Donald W., II., to Composite Materials Technology, Inc. Superconductor and process of manufacture. 5,160,794, Cl. 428-661.000.
Wong, Patrick S.: *See—*
Jao, Frank; Wong, Patrick S.; Huynh, Hoa T.; McChesney, Kathy; and Wat, Pamela K., 5,160,744, Cl. 424-473.000.
Woo, Haeng-Cho, to Samsung Electronics Co., Ltd. Mechanism for correcting the printing position of an electronic typewriter. 5,160,207, Cl. 400-697.100.
Woodard, Kenneth E., Jr.: *See—*
Cawlfield, David W.; Dotson, Ronald L.; Duncan, Budd L.; Mendiratta, Sudhir K.; and Woodard, Kenneth E., Jr., 5,160,416, Cl. 204-82.000.
Woods, Denis W.: *See—*
Ward, Ian M.; Woods, Denis W.; and Busfield, Walter K., 5,160,464, Cl. 264-22.000.
Woods, William E.: *See—*
Lemay, Richard A.; Tague, Steven A.; Izbicki, Kenneth J.; and Woods, William E., 5,161,217, Cl. 395-375.000.
Woodward, Antony J.; and Simpson, Stephen M., to Felix Schoeller jr GmbH & Co. KG. Chill roll printing. 5,160,777, Cl. 428-172.000.

Woudstra, Jouke J.: *See—*
Khouw, Frank H. H.; Spiessens, Marinus J.; Nieskens, Martin J. P. C.; and Woudstra, Jouke J., 5,160,706, Cl. 422-140.000.
Wright, Keith D. Vertical spray bottle nozzle. 5,160,071, Cl. 222-383.000.
Wrobel, Avi, to Display Products, Incorporated. Rotatable led cluster device. 5,160,201, Cl. 362-249.000.
Wu, Hans. Holder for a cassette tape. 5,160,027, Cl. 206-387.000.
Wudka, Michael. Shelf support assembly. 5,160,052, Cl. 211-90.000.
Wuerth, Juergen: *See—*
Klein, Hermann-Josef; Adam, Klaus; and Wuerth, Juergen, 5,159,912, Cl. 123-481.000.
Wustrau, Rolf: *See—*
Frankeny, Jerome A.; Frankeny, Richard F.; Hermann, Karl; and Wustrau, Rolf, 5,161,087, Cl. 361-382.000.
Xaloy Incorporated: *See—*
Cox, Walter G., Jr.; and Chou, Schiao F., 5,160,690, Cl. 264-328.100.
Xerox Corporation: *See—*
Birnbaum, David, 5,161,010, Cl. 358-79.000.
Drake, Donald J., 5,160,945, Cl. 346-140.00R.
Fisher, Almon P.; and Drake, Donald J., 5,160,403, Cl. 156-633.000.
Fromm, Paul M.; and Jaskowiak, Timothy R., 5,160,130, Cl. 271-307.000.
Hwang, Shyshung S., 5,160,946, Cl. 346-157.000.
Melnyk, Andrew R.; Herbert, William G.; and Grey, Henry, 5,160,421, Cl. 205-67.000.
Xicor, Inc.: *See—*
Owen, William H.; Caywood, John; Drori, Joseph; Jaffe, James; Nojima, Isao; Sung, Jeffrey; and Wang, Ping, 5,161,157, Cl. 371-10.200.
Xonix Electronic Watch Enterprise Co., Ltd.: *See—*
Chen, Li; and Maa, Pyn, 5,161,129, Cl. 368-19.000.
Yaguchi, Toshiyuki; and Tanaka, Koichi, to Kabushiki Kaisha Toshiba. Circuit for testability. 5,161,160, Cl. 371-22.300.
Yagyu, Mineto, to Canon Kabushiki Kaisha. Photosensor having conductive shielding layer for electrostatic charge dissipation. 5,160,835, Cl. 250-208.100.
Yagyu, Tatsuya: *See—*
Ono, Takashi; Yagyu, Tatsuya; Fukuda, Katsumi; and Terasaki, Minako, 5,160,504, Cl. 8-436.000.
Yamada, Kohei, to Daiwa Company, Ltd. Antistatic mat. 5,160,775, Cl. 428-95.000.
Yamada, Masahiko: *See—*
Sawada, Toshiki; Yamano, Masaru; Kazuo, Taguchi; Kojima, Takao; Ishiguro, Hiroyuki; and Yamada, Masahiko, 5,160,598, Cl. 204-429.000.
Yamada, Motohiro; Yamamoto, Mineo; and Shakushi, Koji, to Minolta Camera Kabushiki Kaisha. Developing means and method for supplying toner to a density detection position and at least one other position. 5,160,968, Cl. 355-208.000.
Yamada, Reiichi: *See—*
Kizaki, Takayasu; Park, Chong-il; and Yamada, Reiichi, 5,160,747, Cl. 425-352.000.
Yamada, Shinichi: *See—*
Taguchi, Kouichi; and Yamada, Shinichi, 5,161,211, Cl. 395-10.000.
Yamada, Sohei; and Yokota, Hideaki, to Kabushiki Kaisha Kosmek. Clamping apparatus for work. 5,160,124, Cl. 269-25.000.
Yamaguchi, Atsuo; and Takebayashi, Etsushi, to Mitsubishi Denki Kabushiki Kaisha. Reference voltage regulator. 5,160,856, Cl. 307-296.800.
Yamaguchi, Kazuhiro: *See—*
Tonariya, Yoshito; Wada, Yukihito; Yamaguchi, Kazuhiro; Yamazaki, Tomio; Sakai, Isamu; Yokoi, Shigeru; Togashi, Mitsuo; and Noguchi, Yukihiro, 5,160,724, Cl. 424-4.000.
Yamaguchi, Kinichiro, to Artpanel Consultant Co., Ltd. Parting surface structure of bulletin device. 5,159,770, Cl. 40-156.000.
Yamaguchi, Noboru. Control method and controller. 5,161,099, Cl. 364-153.000.
Yamaguchi, Shoji: *See—*
Potember, Richard S.; Yamaguchi, Shoji; and Viands, Carla A., 5,161,149, Cl. 369-126.000.
Yamaguchi, Tomoo; and Ikeda, Kenichi, to Nitto Denko Corporation. Composite reverse osmosis membrane and production thereof. 5,160,619, Cl. 210-500.380.
Yamaha Corporation: *See—*
Suzuki, Kunio; and Tomita, Nobuaki, 5,161,179, Cl. 378-161.000.
Tozuka, Akira; Kurakake, Yasushi; and Mizuno, Kotaro, 5,160,799, Cl. 84-653.000.
Yamamoto, Hiroaki: *See—*
Hori, Yoshikazu; Yamamoto, Hiroaki; and Sogawa, Fumihiro, 5,161,148, Cl. 369-112.000.
Yamamoto, Kiyoshi; Kuwabara, Tetsuo; Shigyo, Isamu; Ohmori, Masaki; and Yoshimura, Fumitaka, to Canon Kabushiki Kaisha. Process for manufacturing optical element. 5,160,362, Cl. 65-102.000.
Yamamoto, Mineo: *See—*
Yamada, Motohiro; Yamamoto, Mineo; and Shakushi, Koji, 5,160,968, Cl. 355-208.000.
Yamamoto, Susumu: *See—*
Tomita, Masatoshi; Yamamoto, Susumu; and Tominaga, Chikara, 5,160,552, Cl. 148-277.000.
Yamamoto, Toshifumi: *See—*
Mannichi, Toshihiko; and Yamamoto, Toshifumi, 5,161,036, Cl. 358-466.000.
Yamanishi, Eiichi, to Kabushiki Kaisha Toshiba. Image forming apparatus for controlling stepping motor in accordance with copy magnification. 5,161,029, Cl. 358-296.000.
Yamano, Masaru: *See—*
Sawada, Toshiki; Yamano, Masaru; Kazuo, Taguchi; Kojima, Takao; Ishiguro, Hiroyuki; and Yamada, Masahiko, 5,160,598, Cl. 204-429.000.
Yamanouchi Pharmaceutical Co., Ltd.: *See—*
Kiriyama, Shuhachi, 5,160,736, Cl. 424-195.100.
Yamashita, Ko: *See—*
Nomura, Masaki; Koike, Shin; Yamashita, Ko; Okisaka, Koichi; Sano, Yoshito; Omura, Hisao; Irinatsu, Yuuichi; Masui, Kenji; and Yasumasu, Takeshi, 5,160,759, Cl. 426-602.000.
Yamatake-Honeywell Co., Ltd.: *See—*
Sakai, Yoshirou; Sadaoka, Yoshihiko; Matsuguchi, Masanobu; Kuroiwa, Takaaki; and Abe, Tooru, 5,161,085, Cl. 361-286.000.
Yamauchi, Kiyotaka: *See—*
Yoshizawa, Yoshihito; Yamauchi, Kiyotaka; and Oguma, Shigeru, 5,160,379, Cl. 148-108.000.
Yamauchi, Shin: *See—*
Morihara, Kazushige; Kimura, Masashi; and Yamauchi, Shin, 5,161,084, Cl. 361-225.000.
Yamaura, Shinichi: *See—*
Yasui, Takashi; Yoshioka, Keiichi; and Yamaura, Shinichi, 5,161,229, Cl. 395-775.000.
Yamazaki, Shyoichiro: *See—*
Hayashi, Toshihiro; Takeda, Satoru; Yamazaki, Shyoichiro; Sugie, Masayuki; and Iwaki, Norio, 5,160,754, Cl. 426-94.000.
Yamazaki, Tatsuya: *See—*
Machida, Tetsuo; and Yamazaki, Tatsuya, 5,161,081, Cl. 360-133.000.
Yamazaki, Tomio: *See—*
Tonariya, Yoshito; Wada, Yukihito; Yamaguchi, Kazuhiro; Yamazaki, Tomio; Sakai, Isamu; Yokoi, Shigeru; Togashi, Mitsuo; and Noguchi, Yukihiro, 5,160,724, Cl. 424-4.000.
Yanagida, Toshiharu, to Sony Corporation. Etching method and apparatus. 5,160,398, Cl. 156-345.000.
Yanagimichi, Toyokazu: *See—*
Kajita, Harumasa; Yanagimichi, Toyokazu; Kariya, Tetsuo; Wakabayashi, Toshikazu; Kawashima, Ichiro; Nakanami, Satoshi; and Tanaka, Masami, 5,161,187, Cl. 380-15.000.
Yang, Chin-Hui. Structure of wire conduit terminal assembly. 5,160,809, Cl. 174-48.000.
Yang, Ming-Tung. Quick pipe coupling with inflatable seal and pin retainer. 5,160,175, Cl. 285-104.000.
Yang, Tai-Her. Binary data processor using diffraction and interference of waves. 5,160,838, Cl. 257-113.000.
Yang, Tai-Her. Adjustable brush ac/dc servo motor. 5,160,868, Cl. 310-230.000.
Yano, Hideaki: *See—*
Nishizawa, Muneo; and Yano, Hideaki, 5,160,168, Cl. 280-806.000.
Yano, Hironobu: *See—*
Kitakado, Ryuji; Yano, Hironobu; and Hoki, Tetsuo, 5,161,202, Cl. 382-8.000.
Yano, Shinichiro: *See—*
Harada, Yutaka; Yano, Shinichiro; Miyake, Mutsuko; Kawabe, Ushio; and Nishino, Toshikazu, 5,160,983, Cl. 257-34.000.
Yap, Loo T., to BOC Group, Inc., The. Gas injection apparatus and method. 5,160,458, Cl. 261-76.000.
Yasuhiro, Ohshima: *See—*
Kenji, Naitou; Yasuhiro, Ohshima; and Tadao, Nagai, 5,160,872, Cl. 315-411.000.
Yasui, Takashi; Fukushima, Masanobu; and Hara, Kazuhiko, to Ricoh Company, Ltd. System with selectively exclusionary enablement for plural indirect address type interrupt control circuit. 5,161,228, Cl. 395-725.000.
Yasui, Takashi; Yoshioka, Keiichi; and Yamaura, Shinichi, to Ricoh Company, Ltd. Central processing unit. 5,161,229, Cl. 395-775.000.
Yasuki, Seijiro; Kawai, Kiyoyuki; and Taga, Noboru, to Kabushiki Kaisha Toshiba. Compatible television system with companding auxiliary signal. 5,161,003, Cl. 358-141.000.
Yasumasu, Takeshi: *See—*
Nomura, Masaki; Koike, Shin; Yamashita, Ko; Okisaka, Koichi; Sano, Yoshito; Omura, Hisao; Irinatsu, Yuuichi; Masui, Kenji; and Yasumasu, Takeshi, 5,160,759, Cl. 426-602.000.
Yasumura, Shigeyoshi; Nishi, Tatsunari; and Ito, Seiga, to Kyowa Hakko Kogyo Co. Ltd. Plasminogen activator. 5,160,735, Cl. 424-94.630.
Yazaki: *See—*
Ozaki, Keiichi; Terada, Katsuaki; and Tahara, Shinobu, 5,160,274, Cl. 439-212.000.
Yazaki Corporation: *See—*
Takahashi, Mineo; Nakayama, Susumu; Suzuki, Satoshi; Mori, Akio; Seo, Hiroyuki; Imamura, Minoru; Tanaka, Hiroshi; and Yoneyama, Norihiro, 5,160,812, Cl. 174-135.000.
Yeh, Samual: *See—*
Welt, Sydney; Divgi, Chaitanya R.; Yeh, Samual; Old, Lloyd J.; Oettgen, Herbert F.; Real, Francisco X.; and Sakamoto, Junichi, 5,160,723, Cl. 424-1.100.
Yelderman, Mark; Goldberger, Daniel S.; and Braig, James R. Noncontact infrared tympanic thermometer. 5,159,936, Cl. 128-736.000.
Yhland, Carl, to Centritech AB. Centrifugal separator. 5,160,310, Cl. 494-45.000.

Yih, Robert S.: *See—*
Ash, Kenneth C.; Crocker, William A.; Haygarth, John C.; Lee, David R.; Morris, Donald; Peterson, John R.; Riesen, Jon A.; and Yih, Robert S., 5,160,482, Cl. 423-75.000.

Yip, P. C.: *See—*
Thaler, Arnold; Saud, Ivan; and Yip, P. C., 5,160,831, Cl. 219-506.000.

Yissum Research Development Company: *See—*
Friedman, Michael; and Sintov, Amnon, 5,160,737, Cl. 424-401.000.

Yokohama Rubber Co., Ltd., The: *See—*
Satoh, Hajime, 5,160,671, Cl. 264-36.000.

Yokoi, Hiroshi, to Kanto Kasei Co., Ltd. Nickel plating solution, nickel-chromium electroplating method and nickel-chromium plating film. 5,160,423, Cl. 205-255.000.

Yokoi, Shigeru: *See—*
Tonariya, Yoshito; Wada, Yukihito; Yamaguchi, Kazuhiro; Yamazaki, Tomio; Sakai, Isamu; Yokoi, Shigeru; Togashi, Mitsuo; and Noguchi, Yukihiro, 5,160,724, Cl. 424-4.000.

Yokoigawa, Kazuo: *See—*
Mino, Kaoru; and Yokoigawa, Kazuo, 5,159,854, Cl. 74-810.100.

Yokota, Hideaki: *See—*
Yamada, Sohei; and Yokota, Hideaki, 5,160,124, Cl. 269-25.000.

Yokoyama, Kenji: *See—*
Koga, Keiji; Satoh, Jun-ichi; Yokoyama, Kenji; Nisizawa, Akinori; and Tokuoka, Yasumichi, 5,160,761, Cl. 427-548.000.

Yokoyama, Osamu; and Uchiyama, Shoichi, to Seiko Epson Corporation. Optical system with aberration suppression and optical head utilizing the same. 5,161,040, Cl. 359-19.000.

Yoneyama, Norihiro: *See—*
Takahashi, Mineo; Nakayama, Susumu; Suzuki, Satoshi; Mori, Akio; Seo, Hiroyuki; Imamura, Minoru; Tanaka, Hiroshi; and Yoneyama, Norihiro, 5,160,812, Cl. 174-135.000.

Yoon, Young S., to Sparton Corporation. Electric horn with solid state driver. 5,160,913, Cl. 340-388.000.

Yoshida, Akira: *See—*
Kageyama, Yoshiteru; Sawada, Yoshiaki; and Yoshida, Akira, 5,160,419, Cl. 204-294.000.

Yoshida, Hiroshi; Shibazaki, Mitsuhiro; Kubo, Hiroaki; and Jinbo, Shunji, to Kajima Corporation; and Chemical Grouting Company. Method of improving ground of large area. 5,160,220, Cl. 405-236.000.

Yoshida, Keiichi: *See—*
Ikegami, Tatsuji; Ohbayashi, Tetsuro; Yoshida, Keiichi; and Iguchi, Masashi, 5,160,250, Cl. 415-90.000.

Yoshida Kogyo K.K.: *See—*
Kobayashi, Kenzo; Shimizu, Kenichi; and Yoshioka, Hideaki, 5,160,599, Cl. 205-106.000.

Yoshida, Kousuke: *See—*
Kodama, Kenzaburo; Kamei, Kenji; Yoshida, Kousuke; Ishikawa, Katsuya; Kubo, Yukio; and Takatani, Yoshiaki, 5,160,708, Cl. 422-171.000.

Yoshida, Tsutomu; Inoue, Toshinori; Shirasawa, Toshihiko; and Asahina, Takashi, to Sumitomo Light Metal Industries, Ltd. Molten metal stirring device. 5,160,479, Cl. 266-233.000.

Yoshida, Yasunobu: *See—*
Iwamoto, Tetsushi; Yoshida, Yasunobu; Furuto, Toshiaki; and Sudo, Koichi, 5,160,675, Cl. 264-56.000.

Yoshihiro, Mitsugu: *See—*
Nagai, Yasuo; and Yoshihiro, Mitsugu, 5,161,209, Cl. 388-907.500.

Yoshiji, Takeo; Sato, Yutaka; Takeshima, Akira; and Yoshioka, Teruo, to Honda Giken Kogyo Kabushiki Kaisha. Working line. 5,160,011, Cl. 198-345.300.

Yoshimaru, Tomohisa: *See—*
Takeuchi, Ryoji; Yoshimaru, Tomohisa; and Doi, Akihiko, 5,161,144, Cl. 369-54.000.

Yoshimatsu, Hideaki; and Fukushima, Koichi, to Kabushiki Kaisha Kobe Seiko Sho. Slewing control device for crane. 5,159,813, Cl. 60-459.000.

Yoshimatsu, Hideaki; Hayashi, Norihiko; and Kinugawa, Hideki, to Kabushiki Kaisha Kobe Seiko Sho. Safety device for crane. 5,160,056, Cl. 212-155.000.

Yoshimitsu, Tokio: *See—*
Yoshioka, Shingo; Ogasawara, Kenzi; Sawa, Yoshihide; and Yoshimitsu, Tokio, 5,160,781, Cl. 428-224.000.

Yoshimoto, Masafumi; Nakatsuji, Tadao; Nagano, Kazuhiko; and Tatsu, Tetsuo, to Sakai Chemical Industry Co., Ltd. Ozone decomposing reactor. 5,160,586, Cl. 204-59.00R.

Yoshimura, Fumitaka: *See—*
Yamamoto, Kiyoshi; Kuwabara, Tetsuo; Shigyo, Isamu; Ohmori, Masaki; and Yoshimura, Fumitaka, 5,160,362, Cl. 65-102.000.

Yoshimura, Hiroshi; Kitada, Masahito; Takeuchi, Koichiro; and Doi, Junichi, to Mazda Motor Corporation. Automatic transmission line pressure control system. 5,159,856, Cl. 74-867.000.

Yoshino, Yousuke. Mist-spouting type drilling device. 5,160,229, Cl. 408-59.000.

Yoshio, Kunikiyo: *See—*
Satoh, Masahiro; Watanabe, Tetsuya; Yoshio, Kunikiyo; and Kishiki, Hiroshi, 5,160,662, Cl. 252-299.610.

Yoshioka, Hideaki: *See—*
Kobayashi, Kenzo; Shimizu, Kenichi; and Yoshioka, Hideaki, 5,160,599, Cl. 205-106.000.

Yoshioka, Hiroshi: *See—*
Iwai, Shingo; and Yoshioka, Hiroshi, 5,160,249, Cl. 415-55.300.

Yoshioka, Keiichi: *See—*
Yasui, Takashi; Yoshioka, Keiichi; and Yamaura, Shinichi, 5,161,229, Cl. 395-775.000.

Yoshioka, Shingo; Ogasawara, Kenzi; Sawa, Yoshihide; and Yoshimitsu, Tokio, to Matsushita Electric Works, Ltd. Polyimide composition and prepreg and laminate thereof. 5,160,781, Cl. 428-224.000.

Yoshioka, Teruo: *See—*
Yoshiji, Takeo; Sato, Yutaka; Takeshima, Akira; and Yoshioka, Teruo, 5,160,011, Cl. 198-345.300.

Yoshizawa, Yoshihito; Yamauchi, Kiyotaka; and Oguma, Shigeru, to Hitachi Metals, Ltd. Fe-base soft magnetic alloy and method of producing same. 5,160,379, Cl. 148-108.000.

Young, Harvey J.: *See—*
Brinkley, Paul A.; Brown, Thomas W.; Flinchum, Jack G., Jr.; Perfetti, Thomas A.; Thomasson, James S.; and Young, Harvey J., 5,159,942, Cl. 131-298.000.

Yu, Philip S.: *See—*
Dias, Daniel M.; Iyer, Balakrishna R.; and Yu, Philip S., 5,161,227, Cl. 395-650.000.

Yukumoto, Masao; Ozawa, Michiharu; Ishii, Kazuhide; and Shimizu, Hiroshi, to Kawasaki Steel Corporation. Rapidly solidified Fe-Cr-Al alloy foil having excellent anti-oxidation properties. 5,160,390, Cl. 148-325.000.

Yum, Su I.; and Theeuwes, Felix, to Alza Corporation. Intravenous system for delivering a beneficial agent. 5,160,320, Cl. 604-85.000.

Yura, Shinsuke: *See—*
Inumochi, Mitsuo; Matsuura, Tsukasa; Yura, Shinsuke; and Kumagai, Munehito, 5,161,076, Cl. 360-104.000.

Zabaras, George J., to Shell Oil Company. Electrical submersible pump for lifting heavy oils. 5,159,977, Cl. 166-105.000.

Zachariades, Anagnostis E. Method of producing composite structures of ultra-high-molecular-weight polymers, such as ultra-high-molecular-weight polyethylene products. 5,160,472, Cl. 264-136.000.

Zahnradfabrik Friedrichshafen AG: *See—*
Nikolaus, Heinrich; and Paton, Robert, 5,159,855, Cl. 74-850.000.

Zan, Vunshik. Barrow having high and low positioned wheels. 5,160,153, Cl. 280-43.100.

Zanetti, John M.; and Salerno, David M., to Seismed Instruments, Inc. Myocardial ischemia detection system. 5,159,932, Cl. 128-696.000.

Zang, Thomas: *See—*
Wollbeck, Rudi; and Zang, Thomas, 5,160,673, Cl. 264-45.100.

Zapp, Regie H.: *See—*
Halm, Roland L.; and Zapp, Regie H., 5,160,720, Cl. 423-342.000.

Zell, Karl; and Thom, Guenter, to Siemens Aktiengesellschaft. Backplane wiring. 5,160,272, Cl. 439-101.000.

Zenith Electronics Corporation: *See—*
Citta, Richard W.; and Dicke, Stephen M., 5,161,015, Cl. 358-162.000.

Zeroth, Jerry C.: *See—*
Konicek, Jiri D.; Smith, Robert P.; and Zeroth, Jerry C., 5,160,567, Cl. 156-288.000.

Zexel Corporation: *See—*
Mino, Kaoru; and Yokoigawa, Kazuo, 5,159,854, Cl. 74-810.100.
Nakamura, Miki, 5,159,821, Cl. 62-509.000.

Zheng, Longru, to Eastman Kodak Company. Shallow ohmic contacts to n-$Al_xGa_{1-x}As$. 5,160,793, Cl. 428-620.000.

Zhu, X. Theodore: *See—*
Goronkin, Herbert; Zhu, X. Theodore; and Maracas, George N., 5,160,982, Cl. 257-23.000.

Zierhut, Clarence D.: *See—*
Brancel, Dale H.; Freitas, Michael W.; and Zierhut, Clarence D., 5,160,343, Cl. 606-205.000.

Zimmerman, James C.: *See—*
McCormick, Robert J.; Zimmerman, James C.; and Shlesinger, B. Edward, Jr., 5,160,082, Cl. 229-134.000.

Zirconium Technology Corporation: *See—*
Sharif, Sharif, 5,160,445, Cl. 252-8.551.

Zorabedian, Paul, to Hewlett-Packard Company. Multimode stabilized external cavity laser. 5,161,165, Cl. 372-20.000.

Zuk, Robert: *See—*
Kopf-Sill, Anne R.; and Zuk, Robert, 5,160,702, Cl. 422-72.000.

Zumbrunnen, Michael L.: *See—*
Chu, Richard C.; Ellsworth, Michael J., Jr.; Goth, Gary F.; Simons, Robert E.; and Zumbrunnen, Michael L., 5,161,089, Cl. 361-385.000.

Zwaskis, William: *See—*
Chen, Chao C.; Zwaskis, William; and Ortiz, Mark, 5,160,339, Cl. 606-158.000.

Zwick, Nicholas, to Dialogic Corporation. Automatic number identification blocking system. 5,161,181, Cl. 379-67.000.

Zycon Corporation: *See—*
Howard, James R.; and Lucas, Gregory L., 5,161,086, Cl. 361-321.000.

3COM Technologies, Ltd.: *See—*
Carter, Steven H.; Lockyer, Terence D.; and Gahan, Christopher J., 5,161,192, Cl. 380-48.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 3RD DAY OF NOVEMBER, 1992

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Benoist, Rodney W., to Litton Systems, Inc. Method and system for correcting random walk errors induced by rate reversals in a dithered ring laser gyroscope. Re. 34,121, Cl. 356-350.000.

DF&R Corporation: *See*—
Plahn, Katherine C., Re. 34,120, Cl. 248-206.300.

Foreman, Robert W.; and Meszaros, Anthony G., to Park Chemical Company. Method of heat treating metal using a washable synthetic quenchant. Re. 34,119, Cl. 148-638.000.

Litton Systems, Inc.: *See*—
Benoist, Rodney W., Re. 34,121, Cl. 356-350.000.

Meszaros, Anthony G.: *See*—
Foreman, Robert W.; and Meszaros, Anthony G., Re. 34,119, Cl. 148-638.000.

Park Chemical Company: *See*—
Foreman, Robert W.; and Meszaros, Anthony G., Re. 34,119, Cl. 148-638.000.

Plahn, Katherine C., to DF&R Corporation. Article holding bracket. Re. 34,120, Cl. 248-206.300.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

AT&T Technologies, Inc.: *See*—
Moyer, Harold W., B1 4,399,610, Cl. 29-827.000.

BASF Corporation: *See*—
Hays, Byron G.; and Stanaback, Robert J., B1 4,648,907, Cl. 106-30.000.

Bentle, Larry A.; Mitchell, James W.; and Storrs, Stephen B., to Monsanto Company. Method of somatotropin naturation. B1 4,652,630, 11-3-92, Cl. 530-344.000.

Hayashi, Yoshitaka, to Nippon Seiko Kabushiki Kaisha. Bearing assembly. B1 4,795,278, 11-3-92, Cl. 384-448.000.

Hays, Byron G.; and Stanaback, Robert J., to BASF Corporation. High color strength diarylide yellow pigment compositions. B1 4,648,907, 11-3-92, Cl. 106-30.000.

Iggulden, Jerry R.: *See*—
Streck, Donald A.; and Iggulden, Jerry R., B1 5,023,931, Cl. 455-21.000.

Ishiguro, Hiroyuki: *See*—
Yamada, Tetsusyo; Kojima, Takao; Ishiguro, Hiroyuki; and Kami, Yoshihide, B1 5,047,137, Cl. 204-425.000.

Kami, Yoshihide: *See*—
Yamada, Tetsusyo; Kojima, Takao; Ishiguro, Hiroyuki; and Kami, Yoshihide, B1 5,047,137, Cl. 204-425.000.

Kojima, Takao: *See*—
Yamada, Tetsusyo; Kojima, Takao; Ishiguro, Hiroyuki; and Kami, Yoshihide, B1 5,047,137, Cl. 204-425.000.

Maurukas, Jonas. Biological composition for use as a reference control in diagnostic analysis. B1 3,876,375, 11-3-92, Cl. 436-16.000.

McLaughlin, Gary G. Abdominal exerciser. B1 4,775,148, 11-3-92, Cl. 482-124.000.

Mitchell, James W.: *See*—
Bentle, Larry A.; Mitchell, James W.; and Storrs, Stephen B., B1 4,652,630, Cl. 530-344.000.

Monsanto Company: *See*—
Bentle, Larry A.; Mitchell, James W.; and Storrs, Stephen B., B1 4,652,630, Cl. 530-344.000.

Moyer, Harold W., to AT&T Technologies, Inc. Assembling an electronic device. B1 4,399,610, 11-3-92, Cl. 29-827.000.

NGK Spark Plug Co., Ltd.: *See*—
Yamada, Tetsusyo; Kojima, Takao; Ishiguro, Hiroyuki; and Kami, Yoshihide, B1 5,047,137, Cl. 204-425.000.

Nippon Seiko Kabushiki Kaisha: *See*—
Hayashi, Yoshitaka, B1 4,795,278, Cl. 384-448.000.

Pennsylvania Research Organization, The: *See*—
Varadan, Vijay K.; and Varadan, Vasundara V., B1 4,948,922, Cl. 174-35.0GC.

Stanaback, Robert J.: *See*—
Hays, Byron G.; and Stanaback, Robert J., B1 4,648,907, Cl. 106-30.000.

Storrs, Stephen B.: *See*—
Bentle, Larry A.; Mitchell, James W.; and Storrs, Stephen B., B1 4,652,630, Cl. 530-344.000.

Streck, Donald A.; and Iggulden, Jerry R., to Streck, Donald A.; and Iggulden, Jerry R. Television local wireless transmission and control. B1 5,023,931, 11-3-92, Cl. 455-21.000.

Varadan, Vasundara V.: *See*—
Varadan, Vijay K.; and Varadan, Vasundara V., B1 4,948,922, Cl. 174-35.0GC.

Varadan, Vijay K.; and Varadan, Vasundara V., to Pennsylvania Research Organization, The. Electromagnetic shielding and absorptive materials. B1 4,948,922, 11-3-92, Cl. 174-35.0GC.

Yamada, Tetsusyo; Kojima, Takao; Ishiguro, Hiroyuki; and Kami, Yoshihide, to NGK Spark Plug Co., Ltd. Solid electrolyte air/fuel ratio sensor with voltage control. B1 5,047,137, 11-3-92, Cl. 204-425.000.

LIST OF DESIGN PATENTEES

Aigner, Friedrich, to Steyr-Daimler-Puch AG. Pistol. 330,749, 11-3-92, Cl. D22-104.000.

Alain, Jacques R. Wiper washer unit for the rear window of a cap for the bed of a pickup truck. 330,696, 11-3-92, Cl. D12-155.000.

Alco Industries Inc.: *See*—
Goetz, Charles R., 330,652, Cl. D6-479.000.

Allsteel Inc.: *See*—
Zapf, Otto, 330,641, Cl. D6-421.000.
Zapf, Otto, 330,642, Cl. D6-421.000.
Zapf, Otto, 330,643, Cl. D6-421.000.

American Lighting Fixture Corp.: *See*—
Segill, William; Segill, Mark E.; and Dangelo, Michael, 330,780, Cl. D26-154.000.

American National Can Company: *See*—
Halasz, Andrew; Moloney, Thomas E.; Chernikoff, Nelson N.; and Zenger, Richard D., 330,676, Cl. D9-556.000.

Anderson, Mark; and Griffin, James. Disposable artificial vagina for collecting of seminal fluid from animals. 330,762, 11-3-92, Cl. D24-108.000.

AT&T Bell Laboratories: *See*—
Gowda, Hanumaiah L.; Kowalik, John, Jr.; Mack, Henry J., Jr.; Mayer, David J.; and Miggels, Stephen G., 330,705, Cl. D14-114.000.

Ateliers Reunic Caddie: *See*—
Joseph, Alice, 330,684, Cl. D10-106.000.

Avnet, Inc.: *See*—
Stagl, Peter M., 330,773, Cl. D25-122.000.

Balster, Melvin E.; Kruschke, Delton A.; and Easely, James B., to Mebco Industries, Inc. Hair pick and comb. 330,781, 11-3-92, Cl. D28-25.000.

Balster, Melvin E.; Kruschke, Delton A.; and Easely, James B., to Mebco Industries, Inc. Hair pick. 330,782, 11-3-92, Cl. D28-31.000.

Bareiss, Raymond E. Pedestal or similar article. 330,654, 11-3-92, Cl. D6-495.000.

Bareiss, Raymond E. Pedestal or similar article. 330,655, 11-3-92, Cl. D6-495.000.

Bareiss, Raymond E. Pedestal or similar article. 330,656, 11-3-92, Cl. D6-495.000.

Battaglia, Gino. Serving cart. 330,651, 11-3-92, Cl. D6-479.000.

Bellini, Mario; and Thiel, Dieter, to Fehlbaum & Co. Table. 330,644, 11-3-92, Cl. D6-422.000.

Benjamin Manufacturing, Co.: *See—*
Benjamin, William H., 330,791, Cl. D34-43.000.

Benjamin, William H., to Benjamin Manufacturing, Co. Carrier for glue guns. 330,791, 11-3-92, Cl. D34-43.000.

Bennett, Ward. Desk. 330,645, 11-3-92, Cl. D6-422.000.

Bennett, Ward. Cabinet. 330,647, 11-3-92, Cl. D6-432.000.

Berti, Enzo, to Libman Company, The. Combined sponge and liquid soap dispenser for washing dishes. 330,788, 11-3-92, Cl. D32-45.000.

Beverly Hills Fan Company: *See—*
Rezek, Ron, 330,759, Cl. D23-377.000.

Birner, Joe: *See—*
Munro, Doug S.; and Birner, Joe, 330,639, Cl. D6-335.000.

Blaha, Erich; and Gaida, Gerhard, to Carl-Zeiss-Stiftung, Heidenheim/-Brenz. Confocal laser-scanning ophthalmoscope. 330,769, 11-3-92, Cl. D24-172.000.

Bland, Antoinette D. Combination wristwatch and sweatband. 330,679, 11-3-92, Cl. D10-32.000.

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Braendli, Juerg, to Zweifel Pomy-Chips Ltd. Condiment container. 330,675, 11-3-92, Cl. D9-425.000.

Bramani, Marco, to Vibram S.p.A. Tread surface and periphery of a footwear unit sole. 330,629, 11-3-92, Cl. D2-320.000.

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Brinkmann Corporation, The: *See—*
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Butler, Andrew C.; Seipp, Edwin A., III; Reeder, Kevin J.; and Wharton, Blake R., to Wedge Innovations, Inc. Carpenter's level. 330,682, 11-3-92, Cl. D10-69.000.

Cabot Safety Corporation: *See—*
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Chaney, David B.; Fung, Sam; and Brucker, Jeffrey P., to Midmark Corporation. Sterilizer. 330,771, 11-3-92, Cl. D24-217.000.

Chernikoff, Nelson N.: *See—*
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Coggins, Fred H., to Southern Pro Lures, Inc. Fishing lure. 330,750, 11-3-92, Cl. D22-128.000.

Coleman, Robert L.: *See—*
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Compelube, John: *See—*
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Copeland, Tommie. Lunch box. 330,663, 11-3-92, Cl. D7-627.000.

Cornell, Robert. Combined two-level paper tray and adhesive note dispenser. 330,729, 11-3-92, Cl. D19-78.000.

Craven, Allen W., to Janal Creations Inc. Combined case and sexual education kit. 330,726, 11-3-92, Cl. D19-62.000.

Cravins, Scott C. Decal. 330,732, 11-3-92, Cl. D20-11.000.

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Frachey, Enrico; and Crespan, Alfredo, 330,628, Cl. D2-318.000.

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Davies, John W., III; and Chalupsky, Clay W., to Toro Company, The. Portable heater. 330,756, 11-3-92, Cl. D23-338.000.

DeLaney, Richard P.; and Cunnane, Mark, to Safetech Limited. Portable bench-top cleanroom for use as a work station. 330,757, 11-3-92, Cl. D23-364.000.

Dieperink, Menno; and Joosten, Stefanus F. W., to U.S. Philips Corporation. Luminaire. 330,779, 11-3-92, Cl. D26-84.000.

Dinand, Pierre; Luzzi, Robert; and Seigel, Dena, to Estee Lauder, Inc. Spray bottle. 330,783, 11-3-92, Cl. D28-91.100.

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Matsch, Ronald G., 330,742, Cl. D21-242.000.
Matsch, Ronald G., 330,744, Cl. D21-244.000.

Drew, Darren L. Fishing lure atttachment. 330,751, 11-3-92, Cl. D22-129.000.

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Eastman Kodak Company: *See—*
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Federal Signal Corporation: *See—*
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Fogle, Nolan B. Inflatable floor tent. 330,745, 11-3-92, Cl. D21-253.000.

Frachey, Enrico; and Crespan, Alfredo, to Global Sports Technologies, Inc. Shoe insert. 330,627, 11-3-92, Cl. D2-318.000.

Frachey, Enrico; and Crespan, Alfredo, to Global Sports Technologies, Inc. Shoe insert. 330,628, 11-3-92, Cl. D2-318.000.

Fred Silber Company, The: *See—*
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Fukuda, Takeshi: *See—*
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F2 International GES.m.b.H.: *See—*
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Gaida, Gerhard: *See—*
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Gansky, Alton E.; and Harris, William A. Printing blanket mounting bar. 330,724, 11-3-92, Cl. D18-56.000.

Gem Tackle Company: *See—*
Spickelmire, W. James, 330,752, Cl. D22-134.000.

Georgakis, Evangelos G.; and Hoevel, Kenneth E., to Minnesota Mining and Manufacturing Company. Multicompartment container. 330,670, 11-3-92, Cl. D9-341.000.

Gerlach, Thomas, to Pressalit A/S. Combined toilet seat and cover. 330,755, 11-3-92, Cl. D23-311.000.
Gill, Brian C., to W. W. Cross, Inc. Insulated staple. 330,699, 11-3-92, Cl. D13-154.000.
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Frachey, Enrico; and Crespan, Alfredo, 330,628, Cl. D2-318.000.
Goetz, Charles R., to Alco Industries Inc. Knock down shelving unit. 330,652, 11-3-92, Cl. D6-479.000.
Goldberg, James R.: *See*—
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Gottwald, Adolf, to Friedrich Grohe Armaturenfabrik GmbH & Co. Combined control handle and escutcheon for showers or the like. 330,754, 11-3-92, Cl. D23-254.000.
Gowda, Hanumaiah L.; Kowalik, John, Jr.; Mack, Henry J., Jr.; Mayer, David J.; and Miggels, Stephen G., to AT&T Bell Laboratories. Computer stand. 330,705, 11-3-92, Cl. D14-114.000.
Green, Richard T. Housing for anti-theft detector. 330,683, 11-3-92, Cl. D10-104.000.
Greene, Thomas F.; and Davidson, Arthur B. Pulley for lowering tree branches. 330,671, 11-3-92, Cl. D8-360.000.
Griffin, James: *See*—
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Gutierrez, Manuel. Combined fishing rod holder and stand. 330,753, 11-3-92, Cl. D22-147.000.
Haines, Patrick R. Tie clip. 330,688, 11-3-92, Cl. D11-202.000.
Halasz, Andrew; Moloney, Thomas E.; Chernikoff, Nelson N.; and Zenger, Richard D., to American National Can Company. Can. 330,676, 11-3-92, Cl. D9-556.000.
Hall, Milly S.; Rohrs, Donald L.; and Hung, Kung C., to Brinkman Corporation, The. Outdoor light fixture. 330,777, 11-3-92, Cl. D26-68.000.
Hall, Milly S.; Rohrs, Donald L.; and Hung, Kung C., to Brinkmann Corporation, The. Outdoor light fixture. 330,778, 11-3-92, Cl. D26-68.000.
Hammond, Arden D., Jr. Removable mud flap for vehicles. 330,692, 11-3-92, Cl. D12-185.000.
Hampton, Ralph. Combined mailbox and support. 330,793, 11-3-92, Cl. D99-32.000.
Harriott, Joel M. Guitar body. 330,720, 11-3-92, Cl. D17-20.000.
Harris, Kenneth D., Jr.: *See*—
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Hatchiguian, Joseph, to Sporoptic Pouilloux S.A. Temple for eyeglass frame. 330,718, 11-3-92, Cl. D16-127.000.
Hayashi, Tetsuya; Yako, Hiroshi; Ono, Hiroshi; Uemura, Yuji; and Ellis, Danny E., to Fuji Jukogyo Kabushiki Kaisha. Passenger car. 330,689, 11-3-92, Cl. D12-91.000.
Hensley, Robert L. Wallet for coin, card, and currency. 330,632, 11-3-92, Cl. D3-56.000.
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Je, Patrick N. M., to Essex Electric Pte Ltd. Modular point of sale terminal. 330,722, 11-3-92, Cl. D18-4.000.
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Yuen, John S., 330,775, Cl. D26-46.000.
Johnson, Carl W. Food chopper. 330,664, 11-3-92, Cl. D7-693.000.
Joosten, Stefanus F. W.: *See*—
Dieperink, Menno; and Joosten, Stefanus F. W., 330,779, Cl. D26-84.000.
Jordan, Dianne P. Combined pet food bowl and disposable liner. 330,785, 11-3-92, Cl. D30-129.000.
Jorneus, Lars. Dental implant screw. 330,767, 11-3-92, Cl. D24-156.000.
Joseph, Alice, to Ateliers Reunic Caddie. Electronic gate. 330,684, 11-3-92, Cl. D10-106.000.
Juliana, Vincent A.; and Pancheri, Steven, to Invisible Fence Company, Inc. Signal transmitter. 330,685, 11-3-92, Cl. D10-106.000.
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Kelley, Harry. Shoe mounted foot warmer pouch. 330,623, 11-3-92, Cl. D2-314.000.
Kimura, Kazutaka; and Yokoyama, Kazuhiko, to Honda Giken Kogyo Kabushiki Kaisha. Off road vehicle. 330,694, 11-3-92, Cl. D12-107.000.
Kimura, Kiyoshi, to Kabushiki Kaisha Ogura. Portable hydraulic punching instrument. 330,714, 11-3-92, Cl. D15-128.000.
Kirner, Helmut: *See*—
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Klaric, Valda. Extruded bar. 330,774, 11-3-92, Cl. D25-125.000.
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Kuroki, Nobufusa, to Janome Sewing Machine Co., Ltd. Sewing machine. 330,713, 11-3-92, Cl. D15-70.000.
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Lavin, Robert. Support for an archer's compound bow. 330,633, 11-3-92, Cl. D3-100.000.
Laws, Adam T., to Elowtown Pty. Ltd. Sharps container. 330,765, 11-3-92, Cl. D24-131.000.
Layton, Bruce. Bouyant vest. 330,740, 11-3-92, Cl. D21-238.000.
Ledbetter, Mart O. Combined golf bag and cooler. 330,631, 11-3-92, Cl. D3-37.000.
Lee, Honson, to U.S. Philips Corporation. Television receiver. 330,710, 11-3-92, Cl. D14-126.000.
Lemire, Richard R. Television accessory caddy. 330,649, 11-3-92, Cl. D6-466.000.
Lenhardt, David A., to Omni Merchandising, Inc. Exercise bar. 330,738, 11-3-92, Cl. D21-191.000.
Leu, Carl W., to Poli-Auto, Inc. Dual blade automotive windshield wiper. 330,691, 11-3-92, Cl. D12-155.000.
Liaw, Peter. Combined organizer for desk accessories and rotary file. 330,728, 11-3-92, Cl. D19-76.000.
Libman Company, The: *See*—
Berti, Enzo, 330,788, Cl. D32-45.000.
Licari, Yaffa. Clothes hanger. 330,635, 11-3-92, Cl. D6-317.000.
Lienhard, Julius C. Combined barometer and thermometer or similar article. 330,680, 11-3-92, Cl. D10-53.000.
Lippert, Jeffrey B. Firewood storage rack. 330,648, 11-3-92, Cl. D6-462.000.
Loden, William B. Umbrella support. 330,630, 11-3-92, Cl. D3-10.000.
Lorentzon, Lena. Rectal applicator for pharmaceutical products. 330,764, 11-3-92, Cl. D24-141.000.
Lucas, Robert, to Nike, Inc.; and Nike International, Ltd. Shoe upper. 330,625, 11-3-92, Cl. D2-314.000.
Luten, Everett E. Storage container for chips. 330,734, 11-3-92, Cl. D21-56.000.
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Lyon, Chris J. Container for packaged products. 330,674, 11-3-92, Cl. D9-420.000.

Maas, Paul. Folding room divider. 330,646, 11-3-92, Cl. D6-429.000.
Mack, Henry J., Jr.: *See*—
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Mandraccia, Chris I. Golf tee and ball carrier. 330,634, 11-3-92, Cl. D3-104.000.
Mann, Samuel J., to Inverness Corporation. Electrolysis apparatus. 330,766, 11-3-92, Cl. D24-144.000.
Manning, Marquerite. Towel-like wiper dispenser. 330,658, 11-3-92, Cl. D6-522.000.
Matsch, Ronald G., to Discovery Zone, Inc. Combined amusement play area and an enclosing structure. 330,741, 11-3-92, Cl. D21-242.000.
Matsch, Ronald G., to Discovery Zone, Inc. Combined amusement jumping mattress and an enclosing structure. 330,742, 11-3-92, Cl. D21-242.000.
Matsch, Ronald G., to Discovery Zone, Inc. Combined amusement tube slide and an enclosing structure. 330,744, 11-3-92, Cl. D21-244.000.
Mayer, David J.: *See*—
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McDonald, Steve C.; and Van Noy, Allen W., to Nike, Inc. Shoe upper. 330,626, 11-3-92, Cl. D2-314.000.
McWilliams, Kevin R., to Ceramaspeed Limited. Stove top heating element. 330,661, 11-3-92, Cl. D7-407.000.
Mebco Industries, Inc.: *See*—
Balster, Melvin E.; Kruschke, Delton A.; and Easely, James B., 330,781, Cl. D28-25.000.
Balster, Melvin E.; Kruschke, Delton A.; and Easely, James B., 330,782, Cl. D28-31.000.
Mercer, Loron W. Playground slide. 330,743, 11-3-92, Cl. D21-244.000.
Miceli, Ciro J. R. Frame for multi-wheeled vehicle. 330,690, 11-3-92, Cl. D12-107.000.
Midmark Corporation: *See*—
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Miggels, Stephen G.: *See*—
Gowda, Hanumaiah L.; Kowalik, John, Jr.; Mack, Henry J., Jr.; Mayer, David J.; and Miggels, Stephen G., 330,705, Cl. D14-114.000.
Minnesota Mining and Manufacturing Company: *See*—
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Mitsubishi Denki Kabushiki Kaisha: *See*—
Suzuki, Masakatsu; Sugishima, Eiichi; and Iinuma, Hideo, 330,701, Cl. D13-162.000.
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Mitsushima, Susumu; Ishiyama, Kiyoshige; Okuno, Takeshi; Ogita, Hiromitsu; and Kurokawa, Junichi, to Shinko Electric Co., Ltd. Color printer for computer. 330,723, 11-3-92, Cl. D18-55.000.
Molnar, Ferenc; and Kirner, Helmut, to F2 International GES.m.b.H. Shaft portion of a skeg for a surf sailing board. 330,748, 11-3-92, Cl. D21-231.000.
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Halasz, Andrew; Moloney, Thomas E.; Chernikoff, Nelson N.; and Zenger, Richard D., 330,676, Cl. D9-556.000.
Moschini, Franco, to Poltrona Frau S.p.A. Armchair. 330,638, 11-3-92, Cl. D6-334.000.
Motorla, Inc.: *See*—
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Muderlak, Kenneth J., to Technical Concepts, L.P. Fragrance diffuser cartridge. 330,758, 11-3-92, Cl. D23-366.000.
Munro, Doug S.; and Birner, Joe. Seat with cooler compartment. 330,639, 11-3-92, Cl. D6-335.000.
Nagamatsu, Brian H., to KUMAco. Work holder for stringing beads. 330,668, 11-3-92, Cl. D8-71.000.
Nelson, D. Richard. Garage door seal. 330,772, 11-3-92, Cl. D25-119.000.
Neuendorf, John M. Pizza pie cutter. 330,665, 11-3-92, Cl. D7-693.000.
Newman, Rexford L., Jr. Rocking horse. 330,735, 11-3-92, Cl. D21-75.000.
Newton, Brian L.; and Fukuda, Takeshi, to Dart Industries, Inc. Casserole dish cover. 330,660, 11-3-92, Cl. D7-392.100.
Nike, Inc.: *See*—
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Pia, Francesco A. Water craft. 330,747, 11-3-92, Cl. D21-228.000.
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Pingel, Wayne H.; and Pingel, Donna M. Fuel filter. 330,712, 11-3-92, Cl. D15-5.000.
Piskorowski, Zygmund. Boot. 330,622, 11-3-92, Cl. D2-272.000.
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Powell, Barbara W. Combined trash can and cart therefor. 330,789, 11-3-92, Cl. D34-5.000.
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Spickelmire, W. James, to Gem Tackle Company. Fish line rudder. 330,752, 11-3-92, Cl. D22-134.000.
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Takahashi, Takehiko; and Taketani, Jun, to Combi Corporation. Child's chair. 330,637, 11-3-92, Cl. D6-333.000.
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Waltz, Kevin S.; and Bradd, Sidney H., to Hoover Company, The. Combined vacuum cleaner hose and rack. 330,787, 11-3-92, Cl. D32-31.000.
Watanabe, Katsuhito; Seki, Naoko; and Ino, Eriko, to Oki Electric Industry Co., Ltd. Battery unit for a portable radio telephone. 330,693, 11-3-92, Cl. D13-103.000.
Watanabe, Yoshitsugu, to Sony Corporation. Sign pole. 330,730, 11-3-92, Cl. D20-10.000.
Wedge Innovations, Inc.: *See*—
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Wehrle, Alexander R. Tape dispenser. 330,727, 11-3-92, Cl. D19-69.000.
Welch, Joe L.; Compelube, John; and Friedhoff, Robin D., to Coburn Optical Industries, Inc. Lens profiler. 330,715, 11-3-92, Cl. D15-124.000.
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Wharton, Richard F., to Safco Corporation. Automatically actuated electrical switch for use with an automobile power system. 330,700, 11-3-92, Cl. D13-158.000.
Whitaker, Craig S., to PSC Corp. Bar code scanner. 330,707, 11-3-92, Cl. D14-116.000.
White, Dean S.: *See*—
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Worthington, William J., to Nike, Inc.; and Nike International, Ltd. Shoe upper. 330,624, 11-3-92, Cl. D2-314.000.
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Yamada, Masato; and Egawa, Shunji, to Citizen Watch Co., Ltd. Radiation clinical thermometer. 330,681, 11-3-92, Cl. D10-57.000.
Yamashita, Shoichiro, to Ko-Ken Tool Co., Ltd. Holding pin. 330,673, 11-3-92, Cl. D8-382.000.
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Yoshihara, Tsutomu, to Canon Kabushiki Kaisha. Printer for electronic computer. 330,721, 11-3-92, Cl. D18-50.000.
Yoshikawa, Masashi; and Hata, Hideo, to Terumo Kabushiki Kaisha. Electric clinical sphygmomanometer. 330,768, 11-3-92, Cl. D24-165.000.
Yoshimura, Akira, to W.I.G. Inc.; and Nikko Communications U.S.A., Inc. Collapsable seat. 330,640, 11-3-92, Cl. D6-368.000.
Yuen, John S., to John Manufacturing Limited. Combined flashlight and blinker. 330,775, 11-3-92, Cl. D26-46.000.
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Zazulia, Arnold. Filter housing. 330,746, 11-3-92, Cl. D23-209.000.
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Zuffoletti, John R. Combined candle lighter and snuffer. 330,784, 11-3-92, Cl. D29-2.000.
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LIST OF PLANT PATENTEES

Benardella, Frank A., to Weeks Wholesale Rose Grower, Inc. Hybrid miniature rose plant named Benfig. 8,020, 11-3-92, Cl. 7.100.

Heidgen, Charles F. Geranium plant named 'Midnight Blush'. 8,023, 11-3-92, Cl. 87.120.

Ito Packing Company: *See*—
Taylor, James W., 8,021, Cl. 41.100.

Moore, Ralph S., to Spring Hill Nurseries Company. Rose plant named 'MORspring'. 8,019, 11-3-92, Cl. 2.000.

Spring Hill Nurseries Company: *See*—
Moore, Ralph S., 8,019, Cl. 2.000.

Sweetbriar Development Inc.: *See*—
Wilhelm, Stephen, 8,022, Cl. 46.200.

Taylor, James W., to Ito Packing Company. Nectarine tree named Big Jim. 8,021, 11-3-92, Cl. 41.100.

Weeks Wholesale Rose Grower, Inc.: *See*—
Benardella, Frank A., 8,020, Cl. 7.100.

Wilhelm, Stephen, to Sweetbriar Development Inc. Hybrid raspberry cv. "Lawrence" . 8,022, 11-3-92, Cl. 46.200.

LIST OF STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE 3RD DAY OF NOVEMBER, 1992

Dunn, William F.; and Poulter, Larry W., to United States of America, Air Force. Mold release technique for solid propellant casting tooling. H1111, 11-3-92, Cl. 249-114.100.

Ezaki, Atsuo; Tobita, Keisuke; Ikeda, Hiroshi; and Haraga, Hideaki, to Konica Corporation. Silver halide color photographic light-sensitive material having a wide latitude. H1112, 11-3-92, Cl. 430-506.000.

Haraga, Hideaki: *See*—
Ezaki, Atsuo; Tobita, Keisuke; Ikeda, Hiroshi; and Haraga, Hideaki, H1112, Cl. 430-506.000.

Ikeda, Hiroshi: *See*—
Ezaki, Atsuo; Tobita, Keisuke; Ikeda, Hiroshi; and Haraga, Hideaki, H1112, Cl. 430-506.000.

Konica Corporation: *See*—
Ezaki, Atsuo; Tobita, Keisuke; Ikeda, Hiroshi; and Haraga, Hideaki, H1112, Cl. 430-506.000.

Kramer, Arris H.: *See*—
Smaardijk, Abraham A.; and Kramer, Arris H., H1110, Cl. 428-460.000.

Poulter, Larry W.: *See*—
Dunn, William F.; and Poulter, Larry W., H1111, Cl. 249-114.100.

Shell Oil Company: *See*—
Smaardijk, Abraham A.; and Kramer, Arris H., H1110, Cl. 428-460.000.

Smaardijk, Abraham A.; and Kramer, Arris H., to Shell Oil Company. Resin compositions. H1110, 11-3-92, Cl. 428-460.000.

Tobita, Keisuke: *See*—
Ezaki, Atsuo; Tobita, Keisuke; Ikeda, Hiroshi; and Haraga, Hideaki, H1112, Cl. 430-506.000.

United States of America
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Dunn, William F.; and Poulter, Larry W., H1111, Cl. 249-114.100.

LIST OF PLANT PATENTEES

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CLASSIFICATION OF PATENTS

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CLASS 73

24.05	5,159,843
38	5,159,828
	5,159,829
118.1	5,159,830
	5,159,831
151	5,159,832
155	5,159,833
293	5,159,834
584	5,159,835
587	5,159,836
602	5,159,837
644	5,159,838
714	5,159,839
861.73	5,159,840
862.474	5,159,841
864.01	5,159,842
865.9	5,159,844

CLASS 74

6	5,159,845
69	5,159,846
337.5	5,159,847
421 A	5,159,848
502.3	5,159,849
523	5,159,850
551.9	5,159,851
559	5,159,852
594.6	5,159,853
810.1	5,159,854
850	5,159,855
867	5,159,856

CLASS 75

10.15	5,160,531
10.24	5,160,532
10.45	5,160,533
232	5,160,366
248	5,160,534
397	5,160,367

CLASS 76

108.2	5,159,857

CLASS 81

23	5,159,858
45	5,159,859
57.19	5,159,860
487	5,159,861

CLASS 82

1.11	5,159,862
	5,159,863

CLASS 83

13	5,159,864
16	5,159,865
169	5,159,866
418	5,159,867
674	5,159,868
862	5,159,869
863	5,159,870

CLASS 84

613	5,160,797
615	5,160,798
653	5,160,799

CLASS 89

1.57	5,160,800
6	5,160,801
16	5,160,802

CLASS 91

422	5,159,871
432	5,159,872

CLASS 99

279	5,159,873

CLASS 100

34	5,159,875
88	5,159,876
144	5,159,877

CLASS 101

217	5,159,878
465	5,159,879

CLASS 102

363	5,160,803
443	5,160,804
618	5,160,805

CLASS 104

87	5,159,880

CLASS 105

199.2	5,159,881
362	5,159,882

CLASS 106

1.29	5,160,373
19 R	5,160,369
	5,160,371
	5,160,372
	5,160,535
	5,160,536
20	5,160,370
30	B1 4,648,907
36	5,160,537
154.1	5,160,368
243	5,160,538
401	5,160,374
405	5,160,539
475	5,160,375
672	5,160,540
819	5,160,376

CLASS 108

111	5,159,883

CLASS 110

223	5,159,884
346	5,159,885
347	5,159,886

CLASS 111

109	5,159,887

CLASS 112

121.12	5,159,888
262.3	5,159,874
269.1	5,159,889
278	5,159,890

CLASS 114

230	5,159,891

CLASS 116

28.1	5,159,892

CLASS 118

13	5,160,377
227	5,159,893
300	5,159,894
405	5,160,541
715	5,160,542
	5,160,543
724	5,160,544
725	5,160,545

CLASS 119

3	5,159,895
50.5	5,159,896

CLASS 122

367.3	5,159,897

CLASS 123

1 A	5,159,898
3	5,159,899
	5,159,900
41.47	5,159,901
43 A	5,159,902
65 A	5,159,903
90.15	5,159,904
90.16	5,159,905
90.18	5,159,906
90.55	5,159,907
179.1	5,159,908
188.14	5,159,909
196 AB	5,159,910
467	5,159,911
481	5,159,912
493	5,159,913
494	5,159,914
557	5,159,915
602	5,159,916

CLASS 126

25 R	5,159,917
437	5,159,918

CLASS 127

60	5,160,546

CLASS 128

4	5,159,919
6	5,159,920
20	5,159,921
52	5,159,922
201.27	5,159,923
203.12	5,159,924
401	5,159,925
419 PG	5,159,926
419 R	5,159,927
630	5,159,928
653.2	5,159,929
653.5	5,159,930
660.07	5,159,931
696	5,159,932
719	5,159,934
721	5,159,935
736	5,159,936
753	5,159,933
772	5,159,937
858	5,159,938

CLASS 131

84.2	5,159,939
194	5,159,940
236	5,159,941
298	5,159,942
365	5,159,944

CLASS 132

321	5,159,943

CLASS 134

7	5,160,547
	5,160,548
25.1	5,160,378
85	5,159,945
182	5,159,946

CLASS 135

102	5,159,947
104	5,159,948

CLASS 137

84	5,159,949
390	5,159,950
486	5,159,951
505.41	5,159,952
527.8	5,159,953
557	5,159,954
614.03	5,159,955
624.13	5,159,956
883	5,159,957
888	5,159,958

CLASS 141

1	5,159,959
	5,159,960
10	5,159,961
98	5,159,962

CLASS 144

213	5,159,963

CLASS 148

96	5,160,550
108	5,160,379
201	5,160,549
206	5,160,380
254	5,160,551
269	5,160,381
277	5,160,552
318	5,160,553
325	5,160,390
327	5,160,382
	5,160,389
407	5,160,554
417	5,160,555
525	5,160,556
546	5,160,557
552	5,160,388
638	Re.34,119

CLASS 149

2	5,160,387
88	5,160,386

CLASS 150

147	5,159,964

CLASS 152

209 R	5,160,385
454	5,160,384
510	5,160,383

CLASS 156

60	5,160,558
62.4	5,160,406
69	5,160,391
73.5	5,160,393
73.6	5,160,559
97	5,160,394
154	5,160,560
172	5,160,392
175	5,160,561
189	5,160,562
204	5,160,563
231	5,160,564
242	5,160,565
252	5,160,566
269	5,160,395
288	5,160,567
304.2	5,160,396
345	5,160,397
	5,160,398
359	5,160,399
382	5,160,400
430	5,160,568
439	5,160,569
448	5,160,570
505	5,160,571
510	5,160,572
	5,160,573
600	5,160,401
613	5,160,574
620.7	5,160,575
626	5,160,576
627	5,160,402
633	5,160,403
643	5,160,404
	5,160,405
644	5,160,577
655	5,160,578
656	5,160,407
	5,160,408
	5,160,409
661.1	5,160,579

CLASS 159

47.1 5,160,580

CLASS 160

38 5,159,965
84.1 5,159,966
265 5,159,967
348 5,159,968

CLASS 162

61 5,160,581
117 5,160,582
301 5,160,583
318 5,160,584
358.1 5,160,410
398 5,160,411

CLASS 164

415 5,159,969
517 5,159,970

CLASS 165

10 5,159,971
32 5,159,972
48.1 5,159,973
96 5,159,974
110 5,159,975
144 5,159,976

CLASS 166

105 5,159,977
250 5,159,978
280 5,159,979
294 5,159,980
325 5,159,981
345 5,159,982
379 5,159,983

CLASS 169

38 5,159,984

CLASS 172

723 5,159,985

CLASS 173

48 5,159,986
176 5,159,987

CLASS 174

35 GC 5,160,806
B1 4,948,922
35 R 5,160,807
48 5,160,808
5,160,809
52.4 5,160,810
68.3 5,160,811
135 5,160,812

CLASS 178

19 5,160,813

CLASS 180

8.6 5,159,988
41 5,159,989
197 5,159,990
5,159,991
307 5,159,992

CLASS 181

106 5,160,814
182 5,160,815
285 5,160,816

CLASS 182

82 5,159,993

CLASS 186

40 5,159,994

CLASS 187

88 5,159,995

CLASS 188

77 R 5,159,996
282 5,159,997
340 5,159,998

CLASS 190

102 5,160,000
5,160,001
111 5,159,999

CLASS 192

3.31 5,160,002
5,160,003
17 R 5,160,004
42 5,160,005
56 R 5,160,006
70.17 5,160,007
85 C 5,160,008

CLASS 198

337 5,160,009
345.3 5,160,011
369 5,160,012
412 5,160,013
453 5,160,014
468.01 5,160,015
533 5,160,016
789 5,160,017
803.6 5,160,018
803.9 5,160,019
834 5,160,020

CLASS 200

146 R 5,160,817
148 A 5,160,818

CLASS 203

16 5,160,412
35 5,160,413
57 5,160,414
5,160,585
64 5,160,587

CLASS 204

59 R 5,160,586
60 5,160,415
82 5,160,416
109 5,160,588
129.1 5,160,589
130 5,160,417
141.5 5,160,590
153.12 5,160,418
155 5,160,591
164 5,160,592
180.1 5,160,593
182.9 5,160,594
192.38 5,160,595
266 5,160,596
294 5,160,419
403 5,160,597
425 B1 5,047,137
429 5,160,598
433 5,160,420

CLASS 205

67 5,160,421
106 5,160,599
169 5,160,600
254 5,160,422
255 5,160,423

CLASS 206

204 5,160,021
232 5,160,022
256 5,160,023
268 5,160,024
333 5,160,025
373 5,160,026
387 5,160,027
5,160,028
453 5,160,029
497 5,160,030
519 5,160,031

CLASS 208

46 5,160,032
67 5,160,424
95 5,160,425
111 5,160,033
113 5,160,426
120 5,160,601
131 5,160,602
252 5,160,603

CLASS 209

38 5,160,034
439 5,160,035

CLASS 210

85 5,160,036
5,160,604
90 5,160,037
95 5,160,427
97 5,160,605
107 5,160,428
110 5,160,606
128 5,160,607
134 5,160,608
137 5,160,429
138 5,160,430
143 5,160,609
149 5,160,038
150 5,160,039
167 5,160,040
169 5,160,431
194 5,160,610
205 5,160,041
5,160,611
230 5,160,612
242.3 5,160,432
274 5,160,613
275 5,160,614
321.8 5,160,042
5,160,615
321.84 5,160,433
5,160,616
391 5,160,434
490 5,160,617
5,160,618
500.38 5,160,619
605 5,160,043
608 5,160,620
614 5,160,435
5,160,621
617 5,160,622
634 5,160,044
5,160,045
5,160,623
5,160,624
635 5,160,625
638 5,160,436
5,160,626
639 5,160,627
640 5,160,046
651 5,160,437
667 5,160,628
671 5,160,629
699 5,160,630
707 5,160,438
709 5,160,439
710 5,160,440
720 5,160,631
724 5,160,632
739 5,160,633
748 5,160,634
749 5,160,047
763 5,160,636
766 5,160,637
776 5,160,638
781 5,160,441
791 5,160,442
799 5,160,443
805 5,160,444

CLASS 211

7 5,160,048
13 5,160,049
40 5,160,050
59.2 5,160,051
90 5,160,052
164 5,160,053

CLASS 212

150 5,160,055
155 5,160,056

CLASS 215

1 A 5,160,058
1 C 5,160,057
5,160,059

CLASS 219

10.55 A 5,160,819
116 5,160,820
121.430 5,160,825
121.56 5,160,821
121.64 5,160,822
121.68 5,160,823
5,160,824
203 5,160,827
211 5,160,828
400 5,160,829
458 5,160,830
506 5,160,831

CLASS 220

318 5,160,060
359 5,160,061
374 5,160,054
404 5,160,062
5,160,063
644 5,160,064
724 5,160,065

CLASS 221

172 5,160,066

CLASS 222

109 5,160,067
352 5,160,068
383 5,160,071
463 5,160,072
591 5,160,639

CLASS 224

210 5,160,073
257 5,160,074
328 5,160,075

CLASS 225

4 5,160,076
38 5,160,077

CLASS 226

190 5,160,078

CLASS 227

111 5,160,089

CLASS 228

121 5,160,090
212 5,160,079

CLASS 229

114 5,160,081
134 5,160,082
162 5,160,083

CLASS 235

145 R 5,160,832
449 5,160,833

CLASS 238

10 E 5,160,091
310 5,160,084
366 5,160,085

CLASS 239

18 5,160,086
33 5,160,087
88 5,160,088
288.5 5,160,092
444 5,160,093

CLASS 241

46.06 5,160,095

CLASS 242

47.01 5,160,097
75.510 5,160,098
321 5,160,099

CLASS 244

13 5,160,100
118.1 5,160,101
134 A 5,160,102

CLASS 248

100 5,160,103
176 5,160,104
188.9 5,160,105
206.3 Re.34,120
231.7 5,160,106
327 5,160,107
354.4 5,160,109
523 5,160,110
548 5,160,111
604 5,160,112
638 5,160,113
676 5,160,114

CLASS 249

189 5,160,640

CLASS 250

201.8 5,160,834
208.1 5,160,835
5,160,836
208.2 5,160,837
222.1 5,160,839
287 5,160,840
288 5,160,841
338.1 5,160,842
338 4 5,160,991
339 5,160,826
343 5,160,843
390.07 5,160,844
491.1 5,160,845
492.2 5,160,846
505.1 5,160,847
548 5,160,848
5,160,849
561 5,160,850

CLASS 251

129.12 5,160,115
129.14 5,160,116
144 5,160,117
173 5,160,118
212 5,160,119

CLASS 252

8.551 5,160,445
5,160,642
5,160,643
8.6 5,160,641
32.5 5,160,646
32.7 E 5,160,644
5,160,645
47 5,160,647
47.5 5,160,648
5,160,649
49.6 5,160,650
5,160,651
5,160,652
51.5 A 5,160,446
62.2 5,160,653
62.54 5,160,447
91 5,160,654
95 5,160,448
5,160,655
99 5,160,656
174.14 5,160,657
174.15 5,160,449
174.19 5,160,658
174.21 5,160,450
182.1 5,160,659
186.34 5,160,660
299.01 5,160,451
299.61 5,160,661
5,160,662
301.4 R 5,160,663
305 5,160,664
307 5,160,665
309 5,160,452
311.5 5,160,453
315.2 5,160,454
315.7 5,160,455
373 5,160,456
402 5,160,666
500 5,160,457

CLASS 256

17 5,160,120

CLASS 257

14 5,160,993
23 5,160,982
24 5,161,235
34 5,160,983
113 5,160,838
145 5,160,985
190 5,160,994
207 5,160,995
5,160,997
277 5,160,984
301 5,160,988
307 5,160,987
316 5,160,986
347 5,160,989
355 5,160,990
375 5,160,996
702 5,160,999
712 5,161,000
760 5,160,998

CLASS 261

76 5,160,458
91 5,160,667
92 5,160,459
122.1 5,160,460
140.1 5,160,461

CLASS 264

1.3 5,160,462
1.7 5,160,668
4.3 5,160,669
6 5,160,670
17 5,160,463
22 5,160,464
36 5,160,671
41 5,160,672
45.1 5,160,673
46.5 5,160,465
50 5,160,674
56 5,160,675
60 5,160,676
69 5,160,466
101 5,160,467
5,160,677
5,160,678
109 5,160,679
112 5,160,468
117 5,160,469
123 5,160,470
126 5,160,680
128 5,160,681
136 5,160,471
5,160,472
138 5,160,473
161 5,160,682
173 5,160,684
237 5,160,685
255 5,160,474
5,160,686
271.1 5,160,687
275 5,160,688
297.8 5,160,689
328.1 5,160,690
331.170 5,160,475
334 5,160,691
563 5,160,476

CLASS 266

44 5,160,692
99 5,160,477
200 5,160,478
233 5,160,479
235 5,160,693
275 5,160,480

CLASS 267

136 5,160,121
167 5,160,122
226 5,160,123

CLASS 269

25 5,160,124
50 5,160,125
102 5,160,126
136 5,160,127

CLASS 271

114 5,160,128
178 5,160,129
265 5,160,132
307 5,160,130

CLASS 273

1.5 A 5,160,138
26 D 5,160,131
32 B 5,160,134
67 A 5,160,135
77 A 5,160,136
5,160,137
81 R 5,160,139
84 R 5,160,140
164.1 5,160,141
186.2 5,160,142
5,160,143
5,160,144
260 5,160,145
269 5,160,146
346 5,160,147
408 5,160,133
422 5,160,148

CLASS 277

85 5,160,149

CLASS 279

58 5,160,150
121 5,160,151
128 5,160,152

CLASS 280

43.1 5,160,153
47.19 5,160,154
87.042 5,160,155
250.1 5,160,156
423.1 5,160,157
610 5,160,158
632 5,160,159
707 5,160,160
5,160,161
5,160,162
740 5,160,163
743 5,160,164
775 5,160,165
804 5,160,166
806 5,160,167
5,160,168

CLASS 281

15.1 5,160,169

CLASS 283

35 5,160,170
91 5,160,171

CLASS 285

18 5,160,172
26 5,160,173
32 5,160,174
104 5,160,175
165 5,160,176
319 5,160,177
328 5,160,178
340 5,160,179

CLASS 292

252 5,160,180

CLASS 294

64.1 5,160,181

CLASS 297

129 5,160,182
153 5,160,183
304 5,160,184
377 5,160,185
479 5,160,186

CLASS 300

21 5,160,187

CLASS 307

66 5,160,851
77 5,160,852
140 5,160,853
264 5,160,854
270 5,160,855
296.8 5,160,856
446 5,160,857
450 5,160,858
475 5,160,859
482 5,160,860
530 5,160,861
571 5,160,862
605 5,160,863

CLASS 310

54 5,160,864
67 R 5,160,865
90 5,160,866
154 5,160,867
230 5,160,868
313 A 5,160,869
339 5,160,870

CLASS 312

196 5,160,188
201 5,160,189
5,160,190
405.1 5,160,191

CLASS 315

366 5,160,871
411 5,160,872

CLASS 318

254 5,160,873
268 5,160,874
280 5,160,875

460 5,160,876
568.21 5,160,877
800 5,160,878

CLASS 320

2 5,160,879
32 5,160,880

CLASS 322

7 5,160,881

CLASS 323

314 5,160,882

CLASS 324

158 F 5,160,883
158 R 5,160,884
202 5,160,885
207.16 5,160,886
309 5,160,888
5,160,889
314 5,160,890
318 5,160,891
379 5,160,892
654 5,160,893

CLASS 328

14 5,160,894

CLASS 330

151 5,160,895
251 5,160,896
274 5,160,897
284 5,160,898
288 5,160,899

CLASS 331

18 5,160,900
37 5,160,901
117 R 5,160,902

CLASS 333

12 5,160,903
34 5,160,904
204 5,160,905
5,160,906
246 5,160,907

CLASS 335

68 5,160,908
128 5,160,909
129 5,160,910
216 5,160,911

CLASS 338

22 R 5,160,912

CLASS 340

388 5,160,913
426 5,160,914
552 5,160,915
629 5,160,916
686 5,160,917
709 5,160,918
711 5,160,919
765 5,160,920
783 5,160,921
825.5 5,160,922
825.51 5,160,923
825.52 5,160,924
853.3 5,160,925
870.02 5,160,926
904 5,160,927

CLASS 341

20 5,160,928
57 5,160,929
154 5,160,930

CLASS 342

25 5,160,931
5,160,932
174 5,160,933
351 5,160,934
357 5,160,935

CLASS 343

725 5,160,936
781 P 5,160,937

CLASS 346

1.1 5,160,938
75 5,160,939
5,160,940
76 PH 5,160,941
5,160,942
5,160,943
5,160,944
140 R 5,160,945
157 5,160,946

CLASS 351

52 5,161,234
124 5,160,947

CLASS 352

1 5,160,948
92 5,160,949

CLASS 353

26 A 5,160,950
79 5,160,951

CLASS 354

76 5,160,952
173.1 5,160,953
221 5,160,954
269 5,160,955
286 5,160,956

CLASS 355

27 5,160,960
43 5,160,957
45 5,160,958
53 5,160,959
5,160,961
5,160,962
200 5,160,963
5,160,964
202 5,160,965
206 5,160,966
208 5,160,967
5,160,968
218 5,161,233
284 5,160,970
326 5,160,969

CLASS 356

5 5,160,971
32 5,160,972
73.1 5,160,973
246 5,160,974
326 5,160,975
349 5,160,976
350 Re.34,121
376 5,160,977
394 5,160,978
423 5,160,979
5,160,980
446 5,160,981

CLASS 358

21 R 5,161,004
22 5,161,236
28 5,161,005
31 5,161,006
43 5,161,007
44 5,161,008
79 5,161,010
138 5,161,001
140 5,161,002
141 5,161,003
148 5,161,011
160 5,161,013
5,161,014
162 5,161,015
166 5,161,016
5,161,017
167 5,161,018
183 5,161,012
5,161,019
5,161,020
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	5,160,154	5,160,853	5,160,101	5,161,199	5,161,015	5,161,052
	5,160,170	5,160,859	5,160,126	13 : 5,159,786	5,161,154	5,161,125
	5,160,181	5,160,860	5,160,138	5,159,835	5,161,189	5,161,149
	5,160,194	5,160,865	5,160,188	5,159,889	18 : 5,159,815	5,161,170
	5,160,200	5,160,895	5,160,226	5,160,051	5,159,861	5,161,191

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DESIGN PATENTS

01 :	330,623		330,682		330,785		330,770		330,773		330,784
04 :	330,664		330,690		330,792		330,776	36 :	330,645	45 :	330,634
	330,692		330,695	16 :	330,752		330,780		330,647		330,674
	330,738		330,697	17 :	330,646	26 :	330,736		330,668	48 :	330,672
05 :	330,698		330,709		330,676		330,737		330,707		330,683
	330,750		330,716		330,678	27 :	330,720		330,708		330,711
06 :	330,632		330,717		330,687		330,763		330,747		330,734
	330,636		330,732		330,700		330,781	37 :	330,793		330,777
	330,640		330,735	18 :	330,761		330,782	39 :	330,631		330,778
	330,648		330,740	19 :	330,727		330,790		330,771	51 :	330,633
	330,651		330,759	20 :	330,731	29 :	330,745		330,787		330,680
	330,653		330,791		330,741		330,751	40 :	330,715	53 :	330,688
	330,654	08 :	330,663		330,742	33 :	330,699	41 :	330,624	54 :	330,789
	330,655		330,724		330,743	34 :	330,622		330,625	55 :	330,665
	330,656		330,753		330,744		330,635		330,626		330,712
	330,657	09 :	330,650	24 :	330,630		330,658	42 :	330,652		330,733
	330,662		330,696	25 :	330,649		330,659		330,685		330,756
	330,670	12 :	330,691		330,671		330,705		330,686		330,758
	330,677		330,746		330,729		330,766	44 :	330,660		330,762
	330,679										

PLANT PATENTS

06 :	8,019		8,021		8,022	17 :	8,023	34 :	8,020		

STATUTORY INVENTION REGISTRATIONS

49 :	H1111										

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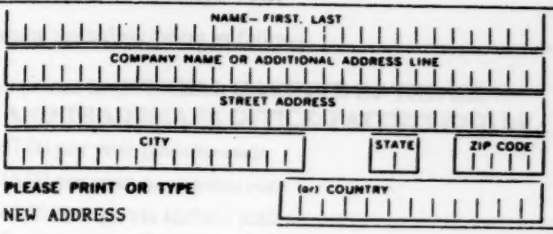

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